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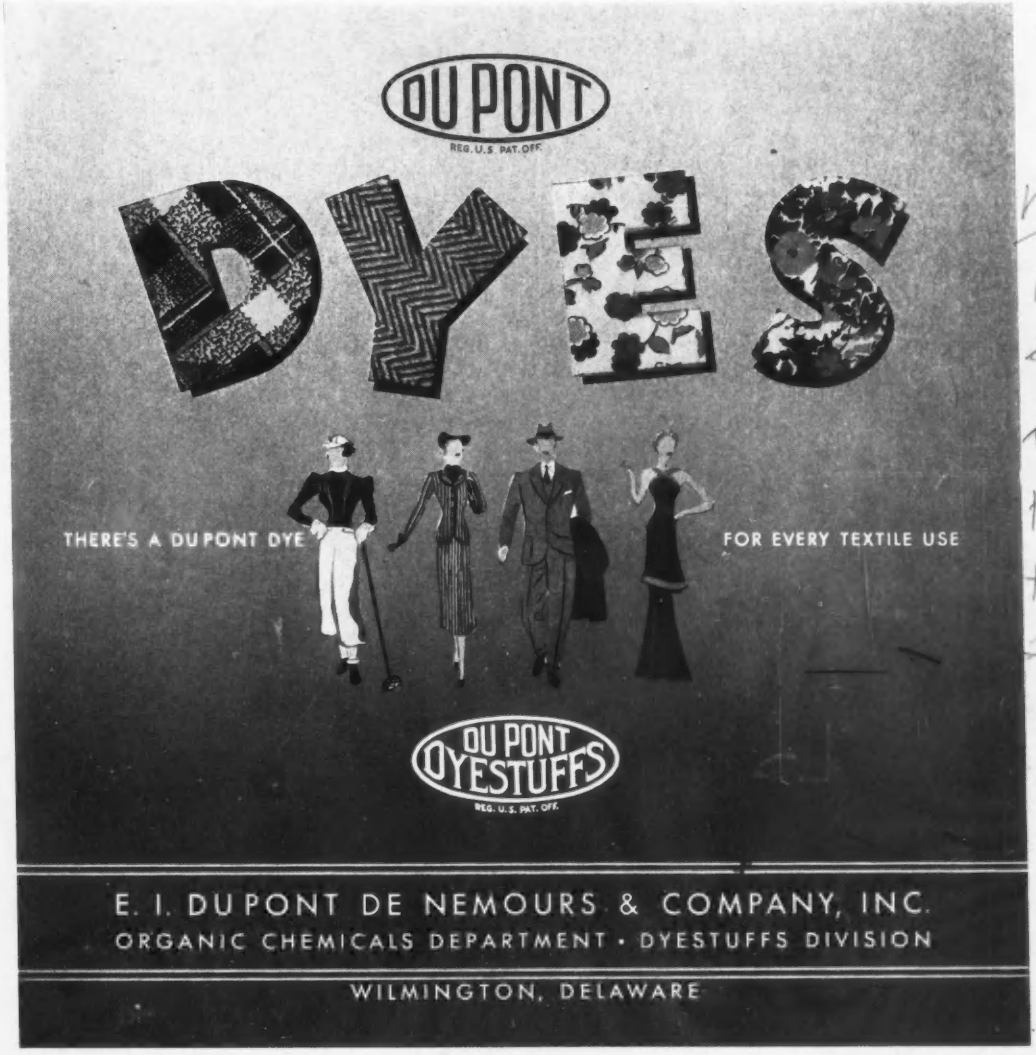
VOLUME 26 JANUARY 11, 1937 NUMBER 1

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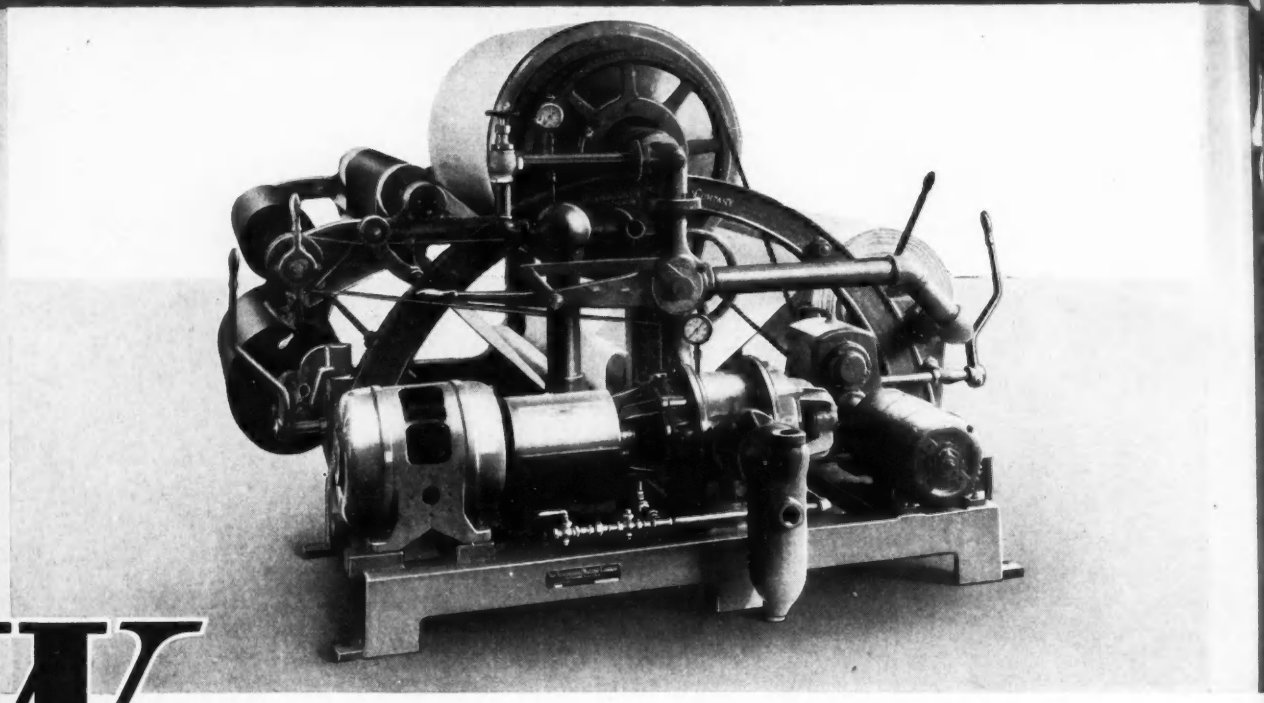

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# AMERICAN DYESTUFF REPORTER

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*Official Publication of the American Association of Textile Chemists and Colorists*

THE OBJECTS OF THIS ASSOCIATION ARE:

*"To promote increase of knowledge of the application of dyes and chemicals in the Textile Industry.*

*"To encourage in any practicable ways research work on chemical processes and materials of importance to the Textile Industry.*

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AMERICAN
DYESTUFF REPORTER

VOLUME 26 JANUARY 11, 1937 NUMBER 1

## The Unwanted

# Yellow Tone in White Woolens

### *An Account of Some Experiments to Discover the Cause and Remedy*

A. J. HALL, B.Sc., F.I.C., F.T.I.

IN a recent article by F. P. W. Wilsome on the processing of knitted wool underwear in this Journal (AMERICAN DYESTUFF REPORTER, 1936, December 14, page 693) reference is made to the yellow color produced in wool by chlorination in the process for making wool unshrinkable. Those finishers who have to deal with chlorinated wool know that if the treatment is conducted under conditions which are too severe the wool acquires a yellow tone which it is exceedingly difficult to remove. The interesting statement made by Wilsome in his article was that this yellowness can be more effectively removed by treating the wool with sulfur dioxide ("stoving") than by bleaching with hydrogen peroxide. This difference in result between the two treatments appeared to invite further investigation and for this reason some experiments were carried out with a view to confirming Wilsome's observation and also elucidating further facts about this yellowness of tone which is such an objectionable feature of chlorinated wool.

In the first place it should be noted that at least two types of wool treatment are liable to give this fiber a yellow color. Treatment with an acidified solution of hypochlorite (as in the unshrinkable wool process) is one, and treatment with an alkali (especially a caustic alkali) is the other. Of course it is most rare that wool is treated with a caustic alkali, but frequently in scouring and similar processes wool is subjected to the action of such alkaline substances as soap and soda ash and these to a less extent are able to produce a yellow color in wool; it is likely that the changes produced in wool by treatment with both the strong and the mild alkalis are similar. It therefore seemed advisable to compare the properties of the yellow colors in wool as caused by both chlorination and caustic alkali treatments.

In producing a yellow color in wool by means of active chlorine it is interesting to note that the color is most easily developed when the chlorine liquor is acid; an alkaline solution of sodium hypochlorite is not so active in this respect. Moreover an alkaline solution of sodium hypochlorite does not reduce the felting power of wool and so make it unshrinkable in washing. On this account the unshrinkable finish for wool materials is always carried out under acid conditions. It is evident that there is always a tendency for unshrinkable wool to be yellow in tone.

There is ground for believing that chlorinated wool which has acquired only a very slight yellowness of tone is by this treatment made more sensitive to yellowing when afterwards treated with alkalis. At any rate, frequent washing of wool garments previously made unshrinkable by the chlorination process, usually made them distinctly yellow or dingy in color whereas similar treatment of ordinary shrinkable garments has not this yellowing effect. Actually, however, experiments have not been carried out to test this accurately.

An important feature connected with the chlorination of wool is that it does not readily make the wool harsh. In contrast, wool made yellow by alkali treatment definitely acquires a harsh handle.

In order to experiment with yellowed wool it was first necessary to prepare some samples and for this purpose scoured knitted wool fabric was used. Firstly, some of the fabric was immersed for about twenty minutes at room temperature in an acidified solution of sodium hypochlorite until it became primrose yellow. It was then thoroughly washed with water, dechlorinated in a dilute solution of sodium bisulfite, and again thoroughly washed and then dried.

Wool yellowed to the same degree by alkali treatment was prepared by immersing a portion of the fabric in a warm solution of caustic soda. Under these conditions the fabric contracted somewhat in area owing to swelling

of the fibers. It was then thoroughly washed with water (washing is not an effective method of removing alkali since wool retains it very strongly and the washing must be prolonged), and dried. During the alkali treatment the wool fabric acquires a very firm handle.

The first evidence of a difference between the chlorinated and alkali-treated wool fabrics was found when they were together soured with cold dilute sulfuric acid. The chlorinated wool retained its yellow color, the depth of shade being inappreciably altered, while the alkali-treated wool quickly became nearly as white as untreated wool. Its whiteness was, however, somewhat dingy. It was also noted that sulfuretted hydrogen gas was evolved from the alkali-treated wool immediately it came in contact with the acid; none of this gas could be detected as arising from the chlorinated wool. It would thus seem that the alkali-treatment had so far decomposed the wool as to form sodium sulfide which would immediately react with acid to give sulfuretted hydrogen. There is much reason to believe that chlorination of wool reduces its sulfur content but since no sulfuretted hydrogen results it is probable that the sulfur is directly converted into sulfuric acid.

It has been mentioned that the chlorinated and alkali-treated wools were of the same primrose yellow color, the treatments having been adjusted so as to give this result. On acidification of these wools it was immediately noticed that the alkali-treated wool was much thinner than the chlorinated wool. From this it can be inferred that to produce a yellow color in wool impoverishment will take place more with the alkali treatment than with chlorination.

The first main experiment was directed towards ascertaining whether or not the yellow color produced by chlorination and alkali-treatment could be removed by bleaching with hydrogen peroxide. Since alkali increases the yellowness it would be at first considered preferable to bleach from a slightly acid solution of hydrogen peroxide, that is, hydrogen peroxide as sold in bulk for this always contains a small proportion of acid for the purpose of stabilizing it. But a preliminary trial showed that very little bleaching took place under these conditions so that it was decided to use a slightly alkaline bleach liquor as employed on the large scale. A bleach liquor containing 3-volumes of hydrogen peroxide and made alkaline to pH=9.0 and stabilized with sodium silicate was therefore prepared.

When the two types of yellowed wool were immersed in this bleach liquor for about two hours at 50° C. it was observed that both untreated and the alkali-treated wool rapidly whitened. As a matter of fact the alkali-treated wool became whiter in color than the untreated wool. In contrast, the chlorinated wool was only slowly affected and at the end of the bleaching treatment it still retained a distinctly yellow color. A portion of the bleached chlorinated wool was then immersed for a few minutes in a 20-volume solution of hydrogen peroxide with the idea of ascertaining whether it was possible to remove the yellowness completely by such a very drastic bleach. But although the yellow color was reduced in depth it was impossible to secure a good white color and the fabric remained inferior in color to the bleached untreated and alkali-treated wools.

Finally, all the bleached portions of wool were thoroughly washed together in cold water. At this stage, the untreated and alkali-treated wools had a good white color (the alkali-treated wool being slightly whiter than the untreated), but curiously enough the extra bleached chlorinated wool became yellower in this washing and finally acquired a yellow color just about equal to that of ordinary bleached chlorinated wool.

In ordinary bleaching practice it would be customary to wash off wool fabric bleached with hydrogen peroxide and either first impregnate it with a softening agent or dry it directly and finish it to its desired dimensions. In other cases the wool may be dyed or soaped or brought into a slightly alkaline condition. It was therefore considered useful to ascertain how these bleached wools behaved when immersed in a very dilute solution of soda ash in the cold.

The wools were therefore placed in a cold solution of pH=8.5. It was noticed that only the chlorinated wools acquired a slimy slippery handle in this treatment; the other wools (except the untreated wool) became somewhat harsh. As regards the color, the bleached and extra-bleached chlorinated wools gradually became yellower but not quite so deep a color as their original primrose shade. The untreated and alkali-treated wools became slightly yellow but the untreated wool now was whiter than the alkali-treated wool. The alkali-treated wool retained its somewhat thin character and thus appeared permanently impoverished.

The wools were again soured in dilute cold sulfuric acid and in this process the untreated and alkali-treated wools became equally white while the two chlorinated wools remained equally and distinctly yellow. After a final thorough washing in cold water (there was no appreciable change thus produced in the colors of any of the wool portions) the wools were dried at a moderate temperature. It was then possible to compare them with a view to ascertaining whether or not the various treatments had successfully removed the yellowness caused by chlorination or alkali-treatment and also which of these adverse treatments caused the most permanent yellowing.

It was immediately noticed that the chlorinated wools, both ordinary and extra-bleached with hydrogen peroxide, were equally and distinctly yellow in color; their color would be considered unsatisfactory if it was that of a wool garment which was supposed to be natural or white. The untreated wool was of a good satisfactory white color, while that of the alkali-treated wool was very slightly yellow and might pass criticism in a white wool garment.

A further series of experiments was now conducted in which the original yellow chlorinated and alkali-treated

wool portions were bleached with sulfur dioxide instead of hydrogen peroxide. It will be remembered that Wilsome (supra) has noted that this method of bleaching is superior to the hydrogen peroxide bleach for overchlorinated wool.

A portion of untreated wool and the chlorinated and alkali-treated wools were hung in a glass jar through which was passed sulfur dioxide gas; the wools at this stage were wet. By absorption of the gas the wools gradually became deep yellow and no distinction could be made between them. After about one-half hour of this treatment the wools were withdrawn and thoroughly washed with water. Both the chlorinated and alkali-treated wools lost their yellowness (due to absorption of sulfur dioxide) and acquired a very slightly yellow color—the untreated wool was much whiter.

The wools were then placed in dilute cold sodium carbonate solution and under these conditions the chlorinated and alkali-treated wools became somewhat more yellow but they were equal as regards this color; the untreated wool was only very slightly affected. It was distinctly evident however, that the chlorinated wool had a slimy handle while the alkali-treated wool had not this characteristic defect.

Afterwards, the wools were rinsed in water and soured together with dilute sulfuric acid. At this stage the chlorinated wool became slightly yellow and its yellowish shade was deeper than that of the alkali-treated wool; the untreated wool was quite a satisfactory white color. Finally the wools were dried at a moderate temperature when it was noticed that the chlorinated wool was quite definitely tinted yellow and in this respect equal to the alkali-treated wool; the untreated wool was a good white.

But on comparing the wools bleached with hydrogen peroxide and with sulfur dioxide there was no doubt but that the latter process gave the better white. It is therefore concluded that:

1. Wools made yellow in color by treatment with acidified sodium hypochlorite or with dilute aqueous caustic soda cannot be bleached either by hydrogen peroxide or sulfur dioxide to give a wool equally as white as untreated wool submitted to the same bleaching treatment. That is, the yellow color cannot be entirely removed by such bleaching and thus permanently makes the wool inferior.

2. The yellow color is more completely removed by the sulfur dioxide bleach than by the hydrogen peroxide bleach.

3. Wool deteriorated by alkaline treatment does not acquire the slimy handle in the wet alkaline condition which characterizes wool excessively chlorinated.

4. Of wools brought to the same yellow color by alkali and chlorination treatments that wool treated by alkali is the more impoverished (thinner in handle and less in weight) and has a stiffer handle.

5. The yellow color of alkali-treated wool is more easily masked by souring than the color produced by chlorination.

6. Excessively chlorinated wool has not a noticeable harsh handle in its dry condition.

In conclusion it may be suggested that if a finisher finds that wool processed by the chlorine unshrinkable finish, or scoured or otherwise treated with alkalis has acquired a yellow tone which is sufficient to spoil its appearance then the most suitable method for reducing this yellowness to the utmost is that of bleaching the wool in sulfur dioxide, that is, by "stoving". If a sulfur stove is not available then there is the possibility that a similar, if not quite so good, effect may be obtained by immersing the wool for about one-half hour in a dilute solution of sodium bisulfite.

# The Phenomena of Dye Mixing

A. H. PETTINGER

SCIENCE progresses, organic chemistry develops and new dyestuffs are continually being discovered, yet of the great majority of colors used daily in the dyehouse, we know really very little. Each user of dyes is interested solely in his own peculiar needs of the moment and has no desire to investigate with any thoroughness the fundamental chemical properties of the powders in his store cupboard. Perhaps it is as well that such work is not expected of him. None the less, there is every reason to believe that even with the commonest and most familiar, a little application of scientific research would in certain cases yield results of considerable interest.

Consider the question of dye mixing. In order to get a match to a given pattern, a dyer may use as many as six different colors—yet how often does he stop to consider the effect of mixing any two of the dyes? Usually he has to trust to luck and instinct, but it may be of interest to note that dyes do influence one another, first as regards solubility. S. R. Trotman and Bateman (J. Soc. Dyers and Col. 1931) showed that whereas basic and acid dyes do usually precipitate one another from solution, this precipitation does not take place if the bath has a pH greater than 5.5. By taking advantage of this fact, a method of obtaining two-color effects on wool-viscose fabric in one bath was evolved.

The mutual precipitation of dyes has received consider-

able study in the past. Brown and Jordan (J. Soc. Dyers and Col. 1923) note the fact that Naphthol Yellow and Night Blue throw each other from solution, and upon this reaction, a method of estimating each color has been worked out. Again, other dyes give similar reactions, for example, Chrysophenine G and Victoria Blue B, Methylene Blue and Benzopurpurine 4B, while Seyewetz records the mutual precipitation between Erythrosine and Magenta. Numerous other pairs are known, and it would appear that almost any basic and acid dyestuffs may be precipitated together if the optimum conditions were accurately known. The important factors appear to be pH and temperature.

The failure of this method to provide a means for the estimation of dyes in solution is due to the fact that, in general, pure standard specimens of assured integrity are usually unobtainable, and so the technique fails as an absolute method but still has some value as a means of comparison.

It has been shown by the I. G. Farbenindustrie A-G., that certain mixtures of vat dyes are faster than others, and they have worked out tables of suitable color mixtures to give the best fastness.

More recently it has been shown that cellulose acetate rayon may be dyed in good solid shades by the use of a mixture of colors when the application of any one singly is a failure and the fiber exhibits no appreciable affinity. Brit. Pat. No. 428,767 describes the use of two anthraquinone derivatives which yield deep blue shades on acetate rayon, while the same compounds employed separately would produce poor colorations. 6 parts of 1-amino-4-anilido-anthraquinone and 4 parts of 1-amino-4-para-toluido-anthraquinone are dissolved in 100 parts of 98 per cent sulfuric acid below 10 deg. C, with stirring. The product is poured into ice water which precipitates the dyes which are then filtered off and well rinsed with water to remove acid, and finally dried. The product is applied to acetate rayon goods after being treated with a dispersing agent in a soap bath.

The essential idea of mixing two indifferent colors to obtain useful shades on acetate rayon is again seen in Brit. Pat. No. 428,841, which deals particularly with azo compounds. By coupling diazotized 4-nitro-2-chlor-aniline with dimethylaniline or di-ethyl-aniline, red dyes which give pale pink shades on acetate rayon are obtained. Mixed together, however, in equimolecular proportions, they give a strong Bordeaux red coloration.

From the foregoing examples it will be seen that there is still much more work to be done in this field apparently and further technical papers or patents will be awaited with interest.

# TECHNICAL NOTES FROM FOREIGN SOURCES

### The Newer Synthetic Detergents and Their Dispersive Power Toward Lime Soaps

*Dr. Kurt Lindner—Monats. f. Textil-Ind.* 50, 65 (1935).—The purpose of the paper is, to correct a view becoming current, that the modern detergents which are chemically classed as fatty-alcohol sulfonates are of little value as dispersing agents for lime soaps. The author has carried out work upon the subject; and a resume, partly a free translation and partly compressed abstraction, should be of interest.

Recent statements in textile literature indicate that the detergents in question display a varying efficiency in regard to their action upon lime soaps forming or to be formed involuntarily in the use of hard water in processing fibers. The group of detergents, sulfonated higher fatty alcohols, of the general type R—O—$SO_3$ Na (the same question must again be raised as to whether such a formula should be ascribed to compounds in which the exact grouping is as yet unconfirmed and is as yet certainly doubtful) is in extensive use, its members possessing a high cleansing power, and in addition often lending an excellent softness and pliability to the goods upon which they are employed. Only, they are not considered, as a class, as good to use when the lime soap problem is encountered. In the general formula given above, R designates a long fatty hydrocarbon chain, such as is found in the higher fatty acids and alcohols. This chain may be of saturated nature, as when cocoanut oil alcohols, cetyl, or stearyl alcohols, etc., are employed or may be unsaturated, or may even in addition carry sulfonic groups, as occurs in the sulfonation of the unsaturated oleyl alcohol, the ordinary unsaturated higher fatty alcohols, or other alcohols high in the series, and internal oxy-groups (e.g., as would result from the elimination of water from between two neighboring hydroxyls in the chain), such as "ricinol" alcohol.

There is another group of products beside the sulfonated fatty alcohols—what may be called fatty acid condensation products, the best known of which is a condensation product of oleic acid and taurine (an aminoethane sulfonic acid), of the type R—CO—NH—R'—$SO_3$ Na,R signifying the unsaturated aliphatic chain of oleic acid. Such compounds, in general, are good detergents, and very good dispersing agents in reference to lime soaps, but are not good softening agents. Such products have been for some time known as definitely recognized chemical substances, in contrast to the fatty-alcohol-sulfonates, whose exact constitution, in the minds of some, at least, is still more or less in doubt.

Quite recently, Muench, in a paper presented to the general meeting of the Verein Deutscher Chemiker, at Cologne, has treated the question of the protective-colloid action of the more recent textile assistants. He concludes

***(Continued on page 22)***

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JANUARY 11, 1937

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## PROCEEDINGS, ANNUAL MEETING

WE have been asked why there is so much delay in publishing the Proceedings of the Annual Meeting.

For many years we have sent to many of those taking part in the meeting not only printer's proof of their paper, but also of any discussion which followed, in order that any necessary corrections might be made. This naturally delays their final publication but has been found to be much more satisfactory to all concerned. The report of the Annual Banquet appears in this issue; a number of the technical papers will appear in the next issue.

### CALENDAR OF COMING EVENTS

**Meeting, Rhode Island Section, Jan. 29, 1937.**

* * *

**Winter Meeting, Piedmont Section, Poinsett Hotel, Greenville, So. Carolina, Jan. 30, 1937.**

# Rayon and Recent Developments*

CHARLES S. VENABLE†

IT is customary, I believe, to begin the discussion of rayon by first intriguing the audience with the romantic history of its development. This is usually followed with a dazzling display of statistics showing the really remarkable growth of this new industrial giant.

I do not consider that to be a wise policy here tonight. Entirely too much publicity has been given rayon in the last two or three years. It should be perfectly safe for me to assume that you are already properly intrigued and properly dazzled without any further work on my part.

However, before I can make a clear story, it will be necessary for me to outline briefly the procedures for making rayon, even at the risk of repeating something that is old to most of you.

The fundamental principle in the manufacture of rayon is the same in all of the three procedures now used commercially in the United States. Cellulose is put in solution—not a true solution but a colloidal solution—and then this solution is forced through the fine holes of a spinneret into a medium that coagulates the fine streams as they emerge. It is thus possible to form a cellulosic thread of continuous filaments that can be twisted, reeled, processed, dried, conditioned, spooled or coned as required.

## CUPRAMMONIUM PROCESS

In this process, the cellulose is dissolved in an ammoniacal solution of copper oxide—more familiar to you, perhaps, as Schweitzer's reagent. The coagulating medium in this case is dilute caustic solution in which the spinneret is immersed. Here is an example of wet spinning. The coagulation results directly in threads of regenerated cellulose, so it is only necessary to remove all adhering copper with acid, wash (maybe bleach), and dry.

The Cuprammonium Process, though it sounds relatively simple, does require efficient recoveries of copper and ammonia to be commercially successful. It has the advantage that, due to the very plastic nature of the filaments as formed, these filaments can be drawn out to very small sizes, thus making easier to spin high filament counts or multifilament yarn. Thus, the process was, for a time, quite popular in Germany. It is used by the New Process Company and the Bemberg Company in this country. Recently, this advantage has tended to lessen in view of the improvement in the other processes. In 1935, only from 3 per cent to 5 per cent of the United States rayon production was by the Cuprammonium Process. The world ratio is of the same order of magnitude.

*Presented at meeting, Philadelphia Section, November 20, 1936.
†Chemical Research Director, Viscose Company.

## CELLULOSE ACETATE

I want to consider next the Cellulose Acetate Process. This is the baby of the rayon industry but a very lusty and growing child.

Cellulose acetate is formed by treating cellulose with acetic acid, acetic anhydride, and a catalyst. The product, after a partial hydrolysis, is soluble in acetone. This solution is then dry spun, the coagulating medium being warm air. The resulting thread needs no further treatment but is simply twisted and wound into package form and sold as such.

In this process, the cellulose is not regenerated, the final product being still an ester of cellulose. It, therefore, differs chemically, physically, and mechanically from the regenerated cellulose yarns produced by the other two Processes. As you know, special dyes are required, also special handling on knitting machines and in the looms. Cellulose acetate yarn has certain desirable characteristics that are rendering it increasingly popular. For example, mixed with viscose rayon, very fine cross dyeing results can be obtained. The hand or feel of cellulose acetate differs from that of other rayon. In 1935, over 22 per cent of the rayon produced in the United States was by the Cellulose Acetate Process. Incidentally, this is about double the world ratio.

## VISCOSE PROCESS

Now for the Viscose Process. Here, the cellulose is treated with caustic and carbon disulfide to form cellulose xanthate, which is soluble in dilute caustic to give the solution called "viscose" by its English inventors, the well-known Cross, Bevan and Beadle. The coagulating medium would obviously be an acid, dilute sulfuric being the one commonly used. Salts, sugars, etc. are in the bath for special purposes. Filaments of regenerated cellulose are thus obtained, which must be washed, freed from deposited sulfur, bleached and dried.

The Viscose Process is by far the most popular of the three processes, accounting for over 85 per cent of the rayon produced in the world; 75 per cent of the rayon produced in the United States. The chemicals used are all relatively cheap, recoveries need not be elaborate, and the process can be adjusted to give yarns of widely differing characteristics.

It is with the Viscose Process yarn that the majority of my remarks will now be concerned. First, I wish to go a little more into details of the spinning operation itself. The picture we get for viscose spinning holds in a general sort of manner for all rayon spinning.

Now try to visualize the progress of the formation of

the thread. An outer skin of set up material forms around the tiny fluid stream as it emerges from the spinneret hole. Progressive coagulation takes place from this outer circle radially inward. This skin is a semipermeable membrane, and accordingly subject to distortion from osmotic pressure. Furthermore, the precipitable wet solids in the viscose occupy only some nine or ten per cent of the volume of the solution, in acetate, from 16 per cent to 17 per cent. The outer skin of the thread then becomes subject to progressive shrinkage as the coagulation proceeds. It is being drawn out lengthwise by the action of the godets but by no means enough to compensate for the shrinkage it must take. Accordingly, it must shrink laterally. If this surface is only partially set up and dehydrated, so that it is still sufficiently plastic, it can shrink by plastic flow and stay circular in shape. Otherwise, it must fold up on itself in proportion to its lack of plasticity. And thus, we get a filament with longitudinal serrations. Upon the number and size and shape of these surface serrations depend to a considerable extent the characteristics of the yarn produced. By varying the composition of the coagulating bath, bath temperature, speed of spinning, size of spinneret hole, age of viscose, we can make the filament cross section jump through the hoop; we can get round filaments out of square holes and cloverleaf filaments out of round holes, and our rayon properties can be varied almost at will. Both acetate and cuprammonium filaments are more plastic as spun than are the viscose filaments. Accordingly, the former yield more rounded cross sections than the latter.

The other important and most interesting feature is the micelle arrangement in these filaments. I am using the term "Micelle" with reservations. There is now raging a distinct argument as to whether micelles really exist in cellulose. But regardless of terminology, there is some definite chain organization within the rayon filament that has a tremendous industrial significance. X-ray studies and examination under polarizing microscopes are valuable tools in analyzing this situation. In the original cotton or wood pulp, the cellulosic micelles or chains are quite nicely orientated along the fiber axis. In the viscose solution, we have managed to preserve the size of the micelles or chains to a considerable extent, but the orientation naturally is random. What do we get when we coagulate? Unfortunately, we tend to get random orientation. Now, a rayon thread is stronger, the longer the micelles or chains and the higher the degree of orientation. So we have to take steps to orientate mechanically while the thread is still in a more or less plastic state. Hence, "stretch spinning."

## RECENT DEVELOPMENTS

### Increased Tensile Strength:

The tensile strengths of all rayon have been increasing slowly but surely. There is every indication that this increase will continue as stretch spinning procedures are improved and coagulation conditions better understood. In reality, there does not seem to be a keen demand for much stronger rayon in general textile work. For special purposes, strong rayons are in demand and for such purposes strong rayons are being developed. Most of you are doubtless familiar with the so-called Lilienfeld Process rayon of several years ago in which the dry and wet strengths were more than double that of the standard yarn. However, this yarn proved to be too brittle and expensive for general technical use.

More recently, we have duPont "Cordura" and the Viscose Company "Tenasco," both yarns being intermediate in strength between standard yarn and the Lilienfeld yarn. Both yarns have met with considerable success in the production of a cord satisfactory for use in pneumatic tires. They give great promise of being able to supplant the cotton used in the more expensive bus and pneumatic truck tires where the life of the carcass under heavy duty conditions is all-important. There is but little doubt that these stronger yarns, even though they sell at a premium, can find other industrial applications as well. Stronger yarns than these can and will be made, if needed.

### Delustered Yarn:

It can be stated without fear of contradiction that the rayon manufacturer is now able to produce a yarn that has any desired degree of dullness or luster. In producing delustered yarns, the rayon manufacturer has taken a leaf out of the book of the Paint and Lacquer Manufacturer. He incorporates in the dope, prior to spinning, an inert, finely divided material that remains intact with the filament after spinning, and which possesses a different index of a fraction from the material composing the filament. For example, he may incorporate finely dispersed mineral oil, finely dispersed organic pigments, or finely dispersed inorganic pigments, or mixtures of two or more delustrants. Most rayons of the present day are delustered by the use of titanium dioxide, with and without some organic delusterant. For a time, the patent situation surrounding the use of titanium dioxide was quite disturbing. This matter has been cleared through the general taking of licenses to the so-called Singmaster patents, and the use of titanium dioxide for delustering is now quite universal. Titanium dioxide is procurable in reasonable amounts at a reasonable price and comes to the plant in a condition practically ready to use. The procedure of spinning a yarn already dull is much more satisfactory than the old procedure, whereby insoluble soaps or inorganic pigments were deposited on the outside of the thread after the filament had been formed. This old procedure at best gave only a temporary delustering.

### Spun Dyed Yarn:

In a similar manner, we may incorporate colored pigments in the yarn for the purpose of obtaining colored yarn. It is necessary, of course, that the pigment withstand all of the processing liquids, and in the case of the Viscose Process, this requirement is rather severe and

limits decidedly the number of pigments available. The advantages to the consumer of this procedure for obtaining colored rayon is obvious. Colors are thus obtainable that are entirely fast and are permanent for the life of the yarn. Perhaps this development may be advanced further as the years go by, but at present, most rayon manufacturers are none too keen over the prospects. If the colors could be limited to five or six standard shades and standard yarn numbers on which steady production was warranted, the job might not be impractical for the rayon producer. A change from one color to another color involves an impractical amount of pipe and machine flushing and results in serious loss of production and many headaches. In addition, the inventories required would be staggering. The thing is possible, however, and may come to pass in a limited way.

## MISCELLANEOUS NOVEL YARNS

You can readily understand that a number of miscellaneous and novel yarns are possible. Inflated yarn is produced by incorporating within the spinning dope a material that evolves a large amount of gas during the period the filament is forming. These inflated yarns are quite warm to the touch, but as a general rule are far below normal in strength.

We can also have flat filament yarn. This yarn can either be a monofil or a thread composed of 20, 30, or 40 filaments twisted together. The effect is a somewhat stiff, wiry yarn that has some application for millinery purposes.

Then we have the interesting slub yarn or so-called thick and thin yarn in which the rayon manufacturer has set himself to deliberately imitate the popular Pongee and Shantung obtained from the wild or sick cocoons. Here, the rayon man renounces his oath to product a uniform yarn.

There are other novel yarns but time will not permit a description of them all.

**Staple Rayons:**

Another development that is now attaining prominent attention is cut staple rayons. As you know, this development first began abroad, but is now threatening to assume important proportions here. I believe a few statistics would be of interest. The *Textile Organon* tells us that:

In 1930, Rayon staple represented 1.6 per cent of total world production.

In 1935, Rayon staple represented 12.5 per cent of total world production.

| | | | | | |
|---|---|---|---|---|---|
| In Italy | 43.5% | of its total | in | 1935 | was staple |
| In Germany | 22% | of its total | in | 1935 | was staple |
| In France | 13% | of its total | in | 1935 | was staple |
| In England | 8.3% | of its total | in | 1935 | was staple |
| In Japan | 5.8% | of its total | in | 1935 | was staple |
| In U. S. A. | 1.9% | of its total | in | 1935 | was staple |

Every country is showing signs of increasing this ratio this year, especially Japan where extraordinary increases are expected.

There is no doubt that a nationalistic spirit—the desire to be independent of King Cotton—prompted this development, particularly in Italy, Germany, and Japan. At the same time it must be admitted that real textile advantages of staple rayon over continuous rayon became apparent. Softness, warmth, ability to mix with other fibers, and cheapness, I'm sure these qualities are familiar to you all. Anyhow, the development is growing in this country, where the original urge does not exist. We now have viscose and acetate and cuprammonium cut staple.

Now I would like to forestall one question that is undoubtedly vexing your minds. Why is cut staple rayon so much cheaper than continuous rayon, particularly viscose cut staple? You would know the answer if you saw each being produced. The cut staple is a mass production affair and much cheaper. Up to the spinning machines, the cost is approximately the same; i.e., we use essentially the same spinning dope. Now, referring particularly to the Viscose Company's staple rayon "Fibro," the staple fiber spinneret contains (for 1½ denier staple) about 1,350 holes and spins a 2,000 denier thread; i.e., 13 times the size of the average continuous thread, has an equal or greater number of spinnerets per machine, and spins at even a faster rate than normal for continuous filaments. The yarn is not gathered in a twisting box, but the bundle from the spinnerets are brought together in the form of a rope or tow running lengthwise the center of the machine. This tow, drawn by big rolls, passes out the end of the machine to a cutter that cuts the filaments very evenly to any desired staple. The processing, bleaching, and drying is then all done in bulk form. Thus, tremendous productions are possible, and at a minimum labor cost. A few standard staple lengths and filament sizes seem to be sufficient for the trade.

The big question today is Japanese staple. Under existing tariffs, Japanese staple can be put down in this country at a price that would eliminate the American manufacturer from the market. That is the real question mark.

**Elasticity Phenomenon:**

I must recite now one feature in which rayon is still deficient in spite of all research. Stories are always made to sound more true if the hero fails to win at least one ball game. The present-day rayons still are not elastic, not nearly as much as we would like to have them. Now, true elasticity is a property difficult to measure, but for most current rayons, it can hardly be said to exceed 2 per cent or 3 per cent. It is decidedly higher for real silk and the wool fiber. It is higher for acetate rayon than viscose rayon, provided you only indulge in low extensions.

The lack of a higher degree of elasticity, for one thing, renders rayon less crease resistant and also less adaptable for full-fashioned hosiery. However, though at present, when true elasticity is mentioned, the face of rayon is slightly red, the brain behind the face still functions and muscles are flexing.

# Moths: Their Habits and Control*

SAMUEL C. PRESCOTT†

THE damage done to woolen fabrics by moths has long been recognized, and finds mention in ancient writings. One has only to recall the passages in both Old and New Testament to realize that the pest was known in Bible times, and it has certainly persisted to our own day despite the efforts of housewives and economic entomologists and chemists to find some means for its eradication or control. Estimates as to the amount of damage annually must of necessity be largely in the nature of guesses, but a few years ago I found the figure set at something of the order of $200,000,000 per year in the United States. While this seems a large figure, it is actually less than two dollars per capita, and I think we can all realize that damage to our personal belongings, clothing, furniture, blankets, rugs, etc. may well exceed this figure if we consider either replacement cost, or deteriorated value and cost of repairs to damaged garments and other things.

It is not easy to compare accurately relative importance among injurious insects, and estimates must perhaps be largely matters of opinion. But when we consider the possibilities of damage to furs, wool, feathers and hair used in manufacturing as well as the damage to finished garments, blankets, furniture, mattresses, brushes, piano felts, etc., we can readily accept the dictum that these insects are of more general concern than any other household pests, with the possible exception of rodents. While personally less annoying than flies, fleas and the disgusting bedbug and cockroaches, we probably actually lose more financially from moth damage than by all these others combined, for the moths work secretly and silently, and avoid intimate companionship of man.

The moths of economic significance to us in America are of three types, two of which are commonly spoken of as clothes moths, while the third, and less common, therefore less destructive, species is known as the tapestry moth. They are all members of the same general class, known as tineid moths and are fairly closely related. The two species regarded as most mischievous are (A) *Tinea pellionella,* the case-bearing clothes moth, and (B) *Tineola biselliella,* the webbing clothes moth. These, although unlike in color and to some extent in distribution are most readily distinguished by the habits of the larval stages, which are, of course the destructive stages in the life history of the insects. In the case-bearing moth the larva as soon as hatched from the egg begins to construct a silken tubular case with interwoven fragments of wool, and lives within this tube, lengthening and enlarging it as the larva grows and dragging it from place to place as it feeds. It is characteristic of this moth that it crawls about restlessly, eating small holes here and there. It is thus possible to explain the small holes often located in fabrics when there are no visible signs of the moth itself in the immediate area. On reaching full growth, 4-16 to 6-16 of an inch in length, the larva may attach its case by silken threads to the material upon which it has been feeding, or before sealing itself into its case it may crawl with the fore part of its body only projecting from the case to another part of the room and then sealing up its nest and completing therein the transformation from larva to pupa or chrysalis, and from pupa to the adult state—the active flying moth. The adult moth is of grayish yellow color on the head and forewings with indistinct darker spots on the middle and outer portions. The hind wings are soft and silky and white or grayish in color.

The webbing clothes moth (*Tineola biselliella*) is about the same size as the case-bearing moth, but the color of the adult is uniformly pale buff without spots. Both moths vary somewhat in size but seldom have a wing expanse of over half an inch and are frequently very much smaller.

The webbing moth is the most abundant and most injurious. It is sometimes called the southern clothes moth, although the distribution of the two species covers about the same area. The larvae of both species are similar, white in color, and fairly plump. Unlike its relative, the larva of the webbing moth does not make a portable case but spins a thin transparent tube or tunnel wherever it goes, or leaves a delicate cobwebby mass of silken threads on the fabric on which it has crawled restlessly about.

The tapestry moth (*Trichophaga tapetzella*) is less common in the United States than the two foregoing species. It is larger than either of these, having a wing expanse of about ¾ of an inch. It is also much more strikingly colored, as the head and the basal third of its third and fore wings are black while the other two-thirds are creamy white or gray in color. The hind wings are pale gray or almost white. Although it is called the tapestry moth, it is not confined to tapestry, nor is it the species most likely to do damage to fabrics of this sort. It is more frequently found in thick heavy fabrics such as carpets. horse blankets, and even in furs and skins. The larvae construct burrows or silk lined galleries in all directions through the infested material and often cause as much damage by these as by the actual destruction of fabric by eating. It is also said that this moth is in its larval stage destructive to

*Presented at meeting, Northern New England Section, November 6, 1936.

†Dean of Science, Massachusetts Institute of Technology.

wallpapers which it apparently penetrates for the purpose of eating the paste on the underside.

There are a number of other moths which are of some economic significance because of destructive action, but these are much more common in Europe than in America. The three species described were presumably native to Europe but were brought to this continent at a very early time as has been the case with so many of our common insects and other pests.

The three species of clothes moths which have been mentioned are all lovers of the dark or dimly lighted places. They are not the moths which seek the light of a lamp or candle and circle around these actively, but are more likely to be seen flitting furtively in the darker portions of rooms or crawling on fabrics or on the walls, in places which do not receive brilliant illumination or under sofas and chairs in dark corners. In this respect they are differentiated from many of the outdoor moths which are attracted by lights and when they gain entrance to houses seek the brilliancy of the lamps or electric light and circle actively about it.

These insects have been described in the foregoing as feeding primarily upon wool, fur, hair and feathers and upon materials manufactured from these raw materials. They are not, however, confined to these products as sources of food, but can live upon many organic substances, glue, dried beef, meal, casein, the skins of other insects, or the skins of animals and upon the dead bodies of other insects even of their own species.

Unlike many other creatures, they seem to prefer food in a very dry state and this brings up the interesting question as to what sources of moisture they have in order to develop the soft, watery structures of the body in the larval stage. Studies which I have carried on with moths in sealed vessels so that there could be no change in the moisture content of the food material with the rise and fall of humidity in the atmosphere have shown that even in extremely dry material in closed spaces the larvae grow and apparently prosper. It seems, therefore, as if they must have some way by which they can transform a part of the organic matter which they use as food into water which is then utilized in building up the moist tissues which compose them.

It is probably clear to all that the life history of these insects consists of a series of phases or cycles in which they appear under totally different characters. Following this through from beginning to end of a generation, we recognize four distinct stages in development. First the egg—the eggs of clothes moths are in general, round, white, fragile or easily crushed, and somewhat smaller than the head of a small pin. They can, however, easily be seen with the unaided eye, especially when deposited on a black field such as a dark fabric or when placed on a dark background. Sometimes the eggs are very loosely deposited. In other instances they seem to be attached by fine silken threads, but in general can be easily removed by vigorous brushing or, in the case of fur, by combing. Eggs may be deposited singly or in small groups. In some instances they can be readily shaken from the surface of fabrics made from hard tested fibers. The eggs are most likely to be deposited in folds or creases of the fabric or, in the case of stuffed or cloth covered furniture, in the crevices between the seat and the arms or backs of chairs or sofas, in the stuffing, or on surfaces away from the light. If left to themselves, these eggs develop into larvae in varying periods of time depending largely upon the temperature. In the temperatures of early summer when we most commonly find the young larvae, they hatch in from four to eight days. With colder weather the hatching may not take place for three weeks and if the temperature is very low, as for example a winter temperature, the eggs remain in inactive condition until the warmth stimulates development. The larva or worm stage which hatches from the egg is the only one in which the clothes moths do damage to fabrics since this is the only stage in which food is taken. The larva as it emerges from the egg is small and white, about 1/16 of an inch long and provided with strong jaws or mandibles which make it possible to begin to feed at once and also with three pairs of legs by means of which it can crawl. What appear to be legs on the remaining body segments are sometimes described as prolegs, but function as props rather than as feet. Under most favorable conditions of food, temperature and humidity, the larva grows fairly rapidly until it reaches a length of approximately ¼ of an inch or sometimes more. This does not always happen, however, for the larva can apparently at any stage in its growth go into a sort of resting period when it remains enclosed in its case or burrow, takes no food, but nevertheless retains its vitality. From this peculiar dormant stage it may later emerge, resume feeding and complete its growth and development as a larva. When it has reached its full development in this stage it seals itself up in its case, if it is one of the case-bearing type or, in the case of the other moths, in a small silken cocoon which it spins, and remains in this state for varied lengths of time. Here again the temperature and possibly also the light and humidity conditions make a difference in the period during which the insect remains in this form. During the larval period the insect sheds its skin several times and when it has reached the adult stage it develops a new skin, thin and delicate, in which the worm remains coiled up for a period, and is transformed into the pupa or chrysalis stage. Marked biological changes go on during this period and the structures which will turn into wings and other organs are developed. Then the chrysalis bursts through its pupal skin, the wings rapidly develop and it becomes the flying moth which is the state of the organism we most commonly see. Both sexes of insects are produced. They are incapable of taking food, but are capable of mating and practically as soon as this is done,

*(Continued on page P18)*

# Annual Banquet*

## *Saturday Evening, December 5, 1936*

*Mr. John G. Masson*: Gentlemen, as Chairman of the Rhode Island Section of the American Association of Textile Chemists and Colorists, it is my privilege and I am glad and happy to extend my welcome to His Excellency, Theodore Francis Green, the Governor of Rhode Island, and to His Honor, James E. Dunne, Mayor of Providence, and to all of you who are here.

I don't know whether you know it, but you are here tonight 650 strong, so my welcome to all of you!

This is the third time that Providence has had the opportunity of welcoming the Convention of this Association; in 1923, 1928, and 1936. Every time it has been a good Convention, and I hope you will find this year's Convention even better than the other ones.

All the credit for what has been done, good and bad, but more good than bad, goes to the Chairman of the Convention Committee, for this Convention. I will not mention his name, as he is too modest, but he has been working hard. No one not closely connected with him knows how much work it has been for him.

Without further remarks, as we are quite late, I will turn the meeting over to our Toastmaster, Mr. Thompson. (Applause).

. . . Mr. Arthur R. Thompson, Jr., presided over the Annual Banquet as Toastmaster. . . .

*Toastmaster Thompson*: Eight years ago tonight we met in Providence. We were welcomed by the Mayor of Providence, the same Mayor who is with us tonight. He is an old friend. I take a great deal of pleasure in presenting to you His Honor, James E. Dunne, Mayor of Providence, Rhode Island. (Applause)

. . . The Mayor was greeted by the band, playing "The Old Grey Mare". . . .

***Remarks by***

### JAMES E. DUNNE

*Mayor Dunne*: The old grey Mayor, he ain't what he used to be, eight years ago, either. After you pass the half century mark, you know, you begin to get cricks in your fingers, in your knees, and in other parts of your anatomy.

When my secretary came in to me and told me that my friend, Ralph Culver, was making me a visit, I knew what it meant. I realized that during the hectic time we had around election time in November a letter had come in from your Association and in some way or other it wasn't answered. Indeed, my secretary, before he told me what Ralph's message was, said to me, "It isn't just one of those every-night banquets that you attend, sometimes three or four; the Chemical boys are having a banquet. You may meet some of those fellows you used to know when you were trying to sell chemicals and oils ten or twelve or sixteen or eighteen years ago."

I was pleased to come here tonight. I have had a very pleasurable evening. Your Toastmaster kidded me a little bit, because he said that this wasn't his regular job as Toastmaster, and that it was rather new to him. I think so far he has done very, very well. He has been very efficient, because, in going around for the past ten years to banquets, three or four every night, I have become rather an expert on Toastmasters. It has been very pleasurable for me to be here. I have been talking with Mr. Masson, here on my right, and I find out that he comes from our City of Woonsocket on the north here. I mentioned the names of six or eight men I used to do business with in Woonsocket when I used to sit out in the Jerusalem's chamber many, many times, like some of you fellows have done (Laughter) only to be told that the purchasing agent was in conference, or that the mill owner was in conference, or something else, when I was trying to sell some denatured olive oil or some nitrited soda or something else.

I have been through the game and I know what it is. I know what it is to go out and come back discouraged. In fact, I might refer to that time that some of you fellows remember, when no one worked for a salary. They always worked on commission and paid their own expenses, they were making so much money.

After I became Mayor I met some of them on the sidewalk here—not during the good times, mind you. They didn't look quite so good as when we stopped at the Young Hotel or the Adelphi in Philadelphia or some other place, and they were perfectly willing to start out and work for so much a month. Things have changed a whole lot.

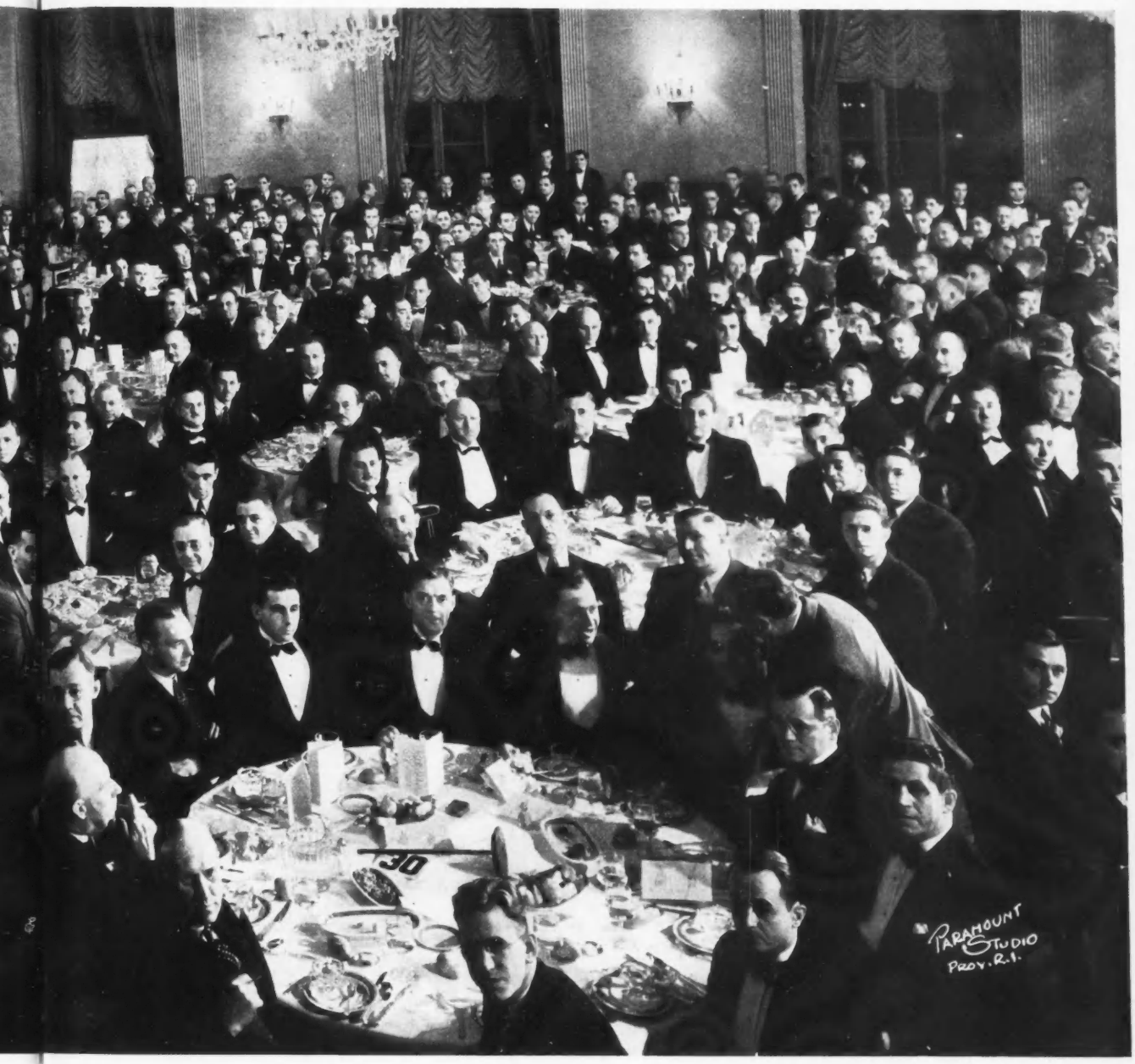
One of them said to me, "What a lucky dog you are. You got out of the chemical salesmanship business. Now that you are Mayor you have a steady job for a couple of years anyway." (Laughter) So I realized that things were pretty tough. You men have been through the good

*Held at Sixteenth Annual Meeting in Providence, R. I.

times and you have been through the bad times, just as cities and towns and the whole country have been through them. Of course, at this time the world is looking for that upward trend that we have all felt, whether it is a municipality or a business, that has been gradually taking place during the past year.

We want textiles to be successful in Providence because when they are successful in Providence the City of Providence is successful. There is no question about it. It means business. You want to realize, you men from outside our borders, that you are in the second largest city in New England. We are all proud of it.

I have always felt that conventions are a wonderful thing for our city. It is rapidly becoming known as the convention city of New England. During this present year, during the time that we are celebrating the three hundredth anniversary of the founding of our city, we had upwards of seventy or eighty conventions here. I have always felt it has done us a whole lot of good. We have derived a great deal of benefit from those conventions,




and it has always been my hope and my feeling that the people who visit us take something away with them which is going to be of benefit to them in their cities and towns, wherever they may come from.

Three hundred years ago this city was founded by Roger Williams. He extended a hand of greeting to every race, regardless of class, color, or creed, for the first time in the history of the world. We have always had the feeling that we have inherited that spirit. It has been a heritage to us. It has always been my hope and our hope here that those who visit us from outside our borders will feel that touch of hospitality. I was in the hotel this noon, and I am sure some of you fellows here have felt that touch of hospitality. (Laughter)

It has been eight years since you have been here but I hope that you won't wait so long again but that you will give us another visit some time in the near future. Thank you. (Applause)

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*Toastmaster Thompson*: Our next speaker is a man we

all love. He is the founder of our Association and today he has in the neighborhood of eighteen to nineteen hundred children. Some man! Dionne could never equal that. He is the first President of our Association. He served us as President from 1921 to 1927. He is our President Emeritus. He is the Chairman of our Research Committee.

I think that no more fitting tribute, if we are going to introduce all of our speakers with music, could be made to Professor Olney than if we would change the words in that beautiful ballad from "I" to "We" and from "truly" to "Olney," when we think of Professor Olney.

. . . Professor Olney was greeted by the band, playing "I Love You Truly". . . .

***Remarks by***

## LOUIS A. OLNEY

*Professor Louis A. Olney*: Mr. Toastmaster, Fellow Members of the American Association of Textile Chemists and Colorists, and Invited Guests: For some time I have been a firm believer in the theory that there are only two things that we were absolutely sure of. You know what they are—death and taxes. But I have come to the conclusion that I must add a third to my own personal list, it is that it is absolutely impossible to escape from making an after-dinner speech at each of your annual banquets.

When our Toastmaster said that serving as a toastmaster at two meetings made him a half-wit, I began to wonder just what I was. I have spoken at fourteen of them. (Laughter) Perhaps you can help me in answering that question.

As some of you know, Providence is my native city, and upon an earlier occasion I reminisced quite a little in regard to my boyhood. I am not going to repeat that, but this being the tercentenary year, with your indulgence, I am going to tell you something about the 250th anniversary.

I was of grammar school age at that time. The celebration lasted one week. Business was practically suspended, bells were rung every day and cannons were fired. They had band concerts all over the city, musical festivals, marvelous fireworks and they had three parades on different days. First they had a military parade which I presume was the grandest thing of the kind ever held in Providence, either before or since. Another day they had a civic parade of fraternal organizations, but the thing I remember most was the third day when they had a trades procession that took just about three hours to go by, and nearly every industry and business in Providence was represented.

Being a descendant of Roger Williams on both sides of the family, and also of Thomas Olney who was one of the ten original settlers of Providence with Roger Williams, my name was published in the paper along with a lot of others, and that gave me quite a little class with the boys in the neighborhood who were conducting auxiliary celebrations of their own.

With all that in mind, I had been looking forward for three or four years to another celebration, and I asked friends in Providence to advise me as to when that was going to occur, but I didn't seem to hear anything. I saw something in the paper about a banquet I believe they had here, but I wasn't invited to that, and if it wasn't for two things I think the 300th anniversary would be a void in my mind.

I am an ardent stamp collector, and they certainly got out a very fine commemorative stamp with the picture of Roger Williams on it. And the second thing is this beautiful souvenir of the banquet.

I don't know whether you all know what they really are for. They were made specially for philatelists, or stamp collectors, to use in studying their stamps, and the scale is to enable them to measure their size. So as I use this glass to examine the Roger Williams stamps, I shall have a very pleasant memory of the 300th anniversary. I shall now have the 350th anniversary to look forward to but I have reason to suspect I won't take any great part in that celebration.

*Members*: You will!

*Professor Olney*: Well, we hope so. (Laughter)

I am supposed to tell you something about the work of the Research Committee, but I am not going to do that because in that voluminous edition of the DYESTUFF REPORTER which has been distributed during the meeting you will find several pages devoted to a description of what our Research Committee is doing. If any of you are sufficiently interested and care to take the time, just sit down and look that over. So we will save that much time tonight for some of the other speakers.

There is one matter, however, that I would like to bring to the attention of the older members of the Association in behalf of some of the younger members, particularly those who are members of the so-called Student Sections.

We have had recently at the Lowell Textile Institute quite a demand for experienced men. We keep getting letters. I have three on my desk now that I have been unable to answer. They want experienced men in this, that and the other branch of the industry. But they don't seem to be inclined to take on recent graduates.

This resolves itself into a problem. It can't be answered by words. It can only be answered by action on the part of employers.

I sometimes wonder where you are going to get men with experience if you won't take on the young men and give them a chance to get a little experience. I can furnish at any time good men who, of course, have not had a great amount of experience. They may not be worth anything to you the first day but you can at least give them a job pushing a truck around. Some of them would

be glad to do that. And after a while you will see their worth, and they may develop into these men of experience for whom you are looking. If you would only make a practice of taking on one or more men once in a while when you don't need anyone you wouldn't have to send out these SOS's for men of experience and say the works will stop if you can't get someone right away.

So I would like to have you think that over. It can't be answered, as I say, by words, but I hope that you will answer it yourselves by taking a little action along that line.

We have other speakers here and the time is getting late. Although, as you may know, I have a very positive aversion to after-dinner speaking, I am glad to have this opportunity to tell you all how much I have enjoyed meeting new friends and many of my old friends, and if it isn't out of season and too early, I am going to close by wishing you all a Merry Christmas and a Happy New Year to come.

Thank you. (Applause)

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*Toastmaster Thompson*: Gentlemen, this is the first opportunity I have ever had of introducing and presenting to any audience the Governor of any State. It gives me a great deal of pleasure now to present to you His Excellency, Theodore Francis Green, Governor of the State of Rhode Island.

***Remarks by***

## THEODORE FRANCIS GREEN

*Governor Green*: Mr. Toastmaster, Distinguished Guests, and Members of the American Association of Textile Chemists and Colorists: I am very glad to be here. After that introduction and after this music, "The Wearing of the Green," I was stimulated for a moment to think I was again in the middle of a campaign and enjoying that exhilaration. I felt very much like an old-fashioned fire engine horse that hears the fire alarm sound, and then, prosaically, the Toastmaster brings me to my senses and reminds me that I am just at one more banquet. (Laughter)

I am sorry, for this reason: I like a fight. I like to look at a fight and I like still better to be in a fight, and this is a very peaceful gathering. (Laughter)

I am glad that you are here on this occasion of our three hundredth anniversary. You have been here several times before on ordinary occasions, but never before when we were really celebrating. As you gathered from what the Mayor said, it has been almost a continuous celebration throughout this Tercentenary.

Our Toastmaster was unkind enough, although he is not alone in that respect, to introduce me as the Governor of the smallest State in the Union. He might at least have said "geographically the smallest State in the Union (Laughter) because, after this continuous celebration throughout this year, we have persuaded ourselves that at least in all respects except geographical size we are the largest State in the Union. For the benefit of most of you, who, I think, come from out of the State, I remind you that beginning three hundred years ago we have had one succession of glorious incidents that warrant that claim.

Roger Williams, you remember, came here when he was ejected from Massachusetts. From time to time while he had been there he had left, either voluntarily or involuntarily, different towns where he didn't get on with the people. In fact, he left England to come over here because he couldn't get on with the people in England. When he settled in one town after another in the Massachusetts Colony he was obliged to leave because he couldn't get on with them, rightly or wrongly. Finally he came here through the wilderness and started a colony of his own right here where we are sitting, on the banks of the Providence River, a new State, on new fundamental ideas. Not only did he get along very well as long as there was nobody else here (Laughter) but he got along afterwards with everybody who came here, because everybody else who couldn't get along anywhere else came here. (Laughter) I don't suppose there ever was such an aggregation of people who couldn't get on with other people, as came here to settle. So we have earned the odd name, which is well deserved, of the "State of Otherwisemindedness." That is the reason Rhode Islanders love a fight, but there are never any hard feelings after a fight.

Roger Williams started with fundamental ideas which have become the American ideas. He had the idea of absolute religious freedom, which was afterwards incorporated into the Constitution of the United States, the Declaration of Independence, and the Constitutions of all the forty-eight States.

He had the idea of democracy, that is, political freedom, which afterwards also was incorporated in those two great documents and is a fundamental American idea.

This colony differed from all the other colonies in this respect: Most of them were founded because of business reasons. Rhode Island was founded without regard to business reasons, on much higher grounds, spiritual reasons. He believed that men should be able not only to be free themselves—they believed that in a lot of other places—but this is peculiar here: He wanted to give everyone else the same freedom that he had, the right to think as he chose. He felt that everybody else should have the same right, to think as he chose, and that has gone on here ever since. The experiment he tried here proved a success. That is now the American experiment, and it is being tested all over the world. Since the World War it has been receiving temporary setbacks here and there, but we Americans believe that it is again going to triumph and spread throughout the whole world. That is the rea-

son I take exception to your Toastmaster's description of Rhode Island as the smallest State in the Union.

I am particularly interested in the subjects you are gathered here to discuss, not because I myself am a chemist but a younger brother of whom I was very fond and who has finished his work here was a great chemist, and he was particularly interested in textile chemistry. He had that same spirit of Roger Williams. He was extraordinarily independent and he was extraordinarily resourceful. When the Great War came he started, under the most adverse conditions, to apply his chemical knowledge. Out at his country place near North Attleboro he took an old steam radiator and some old steam pipes and a lot of other junk and put them together and began to manufacture dyes. He did it so well that it was a most profitable business. I suppose his first barrel sold for as much as all the machinery was worth that he had put together on this junk heap to make it. He went on as long as the war lasted and then continued for some time thereafter until other chemical experiments attracted him more.

I became interested in discussing with him his problems. This was of real help to me as a background when, a year ago last May, if you remember, hearings on the textile industry were held in Washington. It enabled me to go on and argue in behalf of the textile business of New England in Washington. I am not going into the four-point program I argued there. I can't say that it was successful entirely. However, there was one point I didn't argue there which I would like to make here tonight, and I am not going to be very long. It seems to me that there are other points than Governmental aid, whether it is State or Federal, which we must consider in developing the textile industry, a great industry, if not the greatest industry of New England. You men who are gathered here tonight understand the point I am about to make, but I do not think that all who are associated in the textile industry do. My point is that it pays to spend money in hiring brains for research purposes, not only for applied research but for pure research, because we have got to keep the lead and you can only do it by keeping ahead of other countries and other fellows in the same business here.

Every new idea is worth money. Every means that you discover for making goods better or for making them cheaper is valuable not only from the scientific standpoint but from the point of view of dollars and cents and the economic development of the country and the commercial success which you all have at heart.

It applies not only to chemistry and to coloring, it applies to all other mechanical processes. Anyone who can devise some improvement makes a contribution not only for his benefit, not only for the benefit of this industry, but he makes a contribution to the whole community, because we are all interested in the success of this great industry.

When a new discovery is made, when a new invention is made, no matter how much money we have just put into our business, we can't afford to neglect the improvement which it offers, because every new improvement must be adopted and must be made practical and must be put to use. That is the only way in which we can keep our lead. Here in New England that is particularly true.

I have often said to Rhode Islanders that we must make up for the fact we are not near our raw materials and have no immediate access to our markets. We must make it up by superior ingenuity. That has been characteristic of this, the smallest State in the Union, ever since it started. It is one of the qualities of which we are most proud. It shows itself not only in business, it shows itself in many other walks of life and many other processes of human development.

I know you have had a long series of technical talks, which must have been most interesting, and you don't want to hear others tonight.

I thank you very much for the privilege of meeting with you and saying these few words.

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*Toastmaster Thompson*: Our next speaker is a President. He didn't have the strenuous campaign that our President of the United States had to be re-elected. He was elected practically unanimously; I believe it was unanimously. The Governor says it makes no great difference; he was elected and that is all that counts. (Laughter) Gentlemen, I present to you our President, William H. Cady.

. . . President Cady was greeted by the band, playing "K-K-K-Katie"; and the audience arose. . . .

***Remarks by***

## WILLIAM H. CADY

*President Cady*: Mr. Toastmaster, Your Excellency, Fellow Members: Thank you very much.

I was tempted to start off with these words that you have heard so often lately, "My Friends," (laughter) because I never have attended a meeting in all these years where I have seen so many of my old friends. In fact, I never have attended a meeting of this Association when there were so many people present. We have an attendance of something like seven hundred tonight which I think establishes a record for this organization.

I have been wondering why we are increasing so rapidly. Is it possibly because we are pulling out of the depression and have more money in our trouser pockets—that upward trend that His Honor, the Mayor, spoke about? Or is it due to some other reason? I would rather believe that it is because there is a growing appreciation among our members of the value of collective effort, that

we can accomplish more by meeting together in these groups than we ever could individually.

In the old days when dyeing was not even an art, but a mystery, every dyer was for himself. He kept all his secrets to himself and told them only to his son, who passed them on to *his* son. Now there are no secrets in the dyeing industry, and I believe it is just such organizations as this that have made that condition possible.

I think that if this organization were to drop its research work altogether, if it were to drop the Year Book, if it were to cut out Committee reports and do nothing but just have these sectional meetings and this annual meeting for general discussion of technical problems, this Association would still be worthwhile.

I am going to stop in a minute but before I do so I want to pass out a few bouquets. There are a number of men in this organization who have not been half enough appreciated in my judgment and I want to say a few words about each of them.

In the first place, I want to pay a compliment to our able Secretary, Dr. Chapin. If any of you have been intimately associated with him, as I have been for the last three years, you would know what he is doing for this Association. There isn't anybody who is working a tenth as hard as he is for the Association. He spends practically all of his spare time on the Association's work and it is ably and efficiently done, every bit of it. We are very lucky to have a man like him in the office of Secretary. (Applause)

Next I want to pass a bouquet to Dr. Draves. There is a man who spent all summer and all fall getting this technical program together. He has put in a tremendous amount of time on it and I think we will all agree that it was the best program we have ever had. (Applause)

Then I want to pay a compliment to the Local Committee of the Rhode Island Section—the Committee of Arrangements headed by Allison Fletcher. Our local Chairman wouldn't mention his name but I will: Allison Fletcher. (Applause)

He isn't the only one on the Committee, either. Every member—and there are about twenty altogether—plugged all through the months of October and November getting ready for this meeting, and they left no stone unturned to make it a success. I should like to call them all by name, but you can read the names on the program, and that will be just as good.

Finally, I want to speak about the local sections. We have a fine lot of local sections. Every one of them is booming. I have visited five of them during the last year and have found the same fine spirit in all of them. They are enthusiastic, and anxious to get ahead and increase their membership and make their meetings interesting and helpful. Some of the secretaries are really quite unusual.

One of these secretaries received from Dr. Chapin a list of all the delinquents in his section, the men who hadn't paid their dues. He wrote personal letters to each one of them, not a stock letter, but a personal letter, and the result was that he got responses from ninety per cent of those to whom he wrote.

If every secretary would do that, we wouldn't have many delinquents on our books.

There is another secretary I should like to speak about. He heard the other day that a young chemist in the mill in which he worked had just won thirteen dollars on a football pool and he was Johnny on the spot. He got to that fellow before he had had an opportunity to spend the money and signed him up for a junior membership. (Laughter)

It is things like that that make this Association go over the top every time.

I want you men who came here from long distances or from outlying sections to know that we are glad you came. I hope you have had a good time and I hope you will want to come again and I want to say particularly that I hope we will all meet together next year in Philadelphia. (Applause)

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*Toastmaster Thompson*: Some of you fellows have come a long way to attend this convention. You have taken a lot of time away from your work, and away from your homes, to come here and I hope that you have found the sessions worthwhile.

I understand that the man who has come the farthest distance is none other than our old friend, good old Professor C. A. Jones, the Chairman of the Southeastern Section of our Association. Professor Jones traveled 1,160 miles from Atlanta to come here to Providence, and we are glad that he is here. He has come from the farthest distance. Unless somebody can contradict that, I am going to ask Professor Jones to come to the head table. (Professor Jones was not present.)

Gentlemen, we will save this present that I have here in this box for Professor Jones and see that he gets it. But I want you to keep this in mind: that the convention will be in Atlanta two years from now, and it may be that if you will start saving your pennies now so that you can go to Atlanta, you may get just as valuable a prize as Professor Jones gets tonight. But don't forget that next year we go to Philadelphia.

The Governor asks, "What is in that package?" Shall we find out?

. . . The package was opened and showed a beautiful clock. . . .

*Toastmaster Thompson*: Gentlemen, the Rhode Island Section has given this prize to the member traveling the farthest distance to the convention.

There is another man present who traveled just forty miles less than Professor Jones. He traveled 1,120 miles. That is Allen Fuller, of Decatur, Illinois.

Give to the world the best you have and the best will come back to you. Professor Jones has given of his time. We give his time back to him. (Laughter and applause)

In closing I want to thank the Rhode Island Section on behalf of the entire Association. I want to thank "Al" Fletcher and all of you fellows who paid such close attention to the proceedings both during the day and tonight. You have certainly been a swell bunch and we appreciate it.

. . . Following the singing of "Auld Lang Syne," the meeting adjourned. . . .

# Moths: Their Habits and Control

*(Continued from page P10)*

the female begins to deposit eggs. These eggs may be deposited, one or a few at a time, or in considerable numbers and over a period of several days. The total number of eggs produced by the female moth is generally from 100 to 150 but is sometimes much less. Moths in captivity have been known to lay as many as 59 eggs during twenty-four hours. When the female has deposited her full quota of eggs, she very soon dies, and this stage of development of the organism is at an end and the eggs are ready to begin a new cycle.

Our interest in moths should also extend to a knowledge of methods for their eradication or control. Some of these methods have been arrived at emperically and some by experiment. The housewife has known for years that brushing, shaking, beating and exposing fabrics to bright sunlight are protective measures. The same is true obviously of cleaning, and perhaps especially of dry cleaning in which gasoline or some other solvent is employed, these solvents acting destructively on the eggs and upon any larvae which may be present in the fabric. It is sometimes stated that clothing which has been through the process of dry cleaning is exempt from damage, but this is of course not absolutely true unless the treated clothing is at once protected from further infestation by being carefully wrapped or sealed in paper or cloth which is so well sealed or folded that the female moth in the flying stage cannot penetrate into it and deposit her eggs.

I personally had an unfortunate experience in this respect which is possibly of interest. After the war I sent my best uniform to a dry cleanser and on its return it was carefully put away in the box in which it was received. Some months, or possibly a year later, when I had occasion to attend a military function where a uniform was in order, I proudly got out the cleaned and pressed uniform, confident that it would be in excellent condition. Unfortunately this was not the case. Some itinerant female moths with the urge to lay eggs had apparently found entrance into the box, or possibly but unlikely, it had become infected in the dry cleaners establishment after having been put through the process, for the uniform was riddled with holes and was a total loss so far as any further use of it was concerned.

There are on the market, numerous products which serve as repellents for moths and possibly some which are sufficiently toxic to the moth so that fabrics sprayed with these materials will not be attacked. A number of years ago I carried out several experiments with some of these products and found that while their use very largely prevented damage from moths, none of these substances which I studied proved 100 per cent efficient in preventing their action. Of course this may have been due to failure to have every fiber of the fabric brought in contact with the protective material.

For the control of moths there are a number of procedures and materials which can be employed with a fair expectation of good results. Most important of all is constant watchfulness and frequent inspection of materials which are likely to be attacked by these insects. In white wool and light colored fabrics, it is not always easy to see either the egg or the young larva, but it is worth while to make a frequent examination. Beating, brushing or exposure to sunlight have already been mentioned as preventives on a household scale, as is also the wrapping in unbroken paper of sufficient strength to prevent the insects from breaking their way through. When wrapped the bundle should be sealed with gummed paper or have the folded ends so carefully brought together that it would be impossible for an insect to penetrate.

Of chemical treatments the ones which have proved the most effective are possibly naphthalene and paradichlorobenzene, substances which slowly become volatile and in the gaseous form are either markedly distasteful to the insect or actually toxic. Some experiments which I have carried on with these substances indicate that the larvae did not eat while in those atmospheres, but that when removed to conditions where these substances were absent, they again resumed their activity. It is, however, true that these chemicals if used in proper qualities and in closed spaces will greatly restrict the growth and activities of moths. Camphor which is sometimes used in tight chests and trunks also exerts some restraining effect, but is not as good as either of the preceding chemicals. The same is of course true of pyrethrum powder. Carbon disulfide is excellent for fumigation of closets which can be

tightly sealed, as well as chests or trunks which are essentially air tight. The same is true of carbon tetrachloride. Sulfur fumes freshly prepared are also effective, but it is obvious that these can rarely be employed because of danger of bleaching and action on metals. Ethyl dichloride and ethylene oxide especially when mixed with carbon dioxide or carbon tetrachloride have proved very effective.

There are a number of proprietary moth-proofing solutions which can be used as fine sprays or for injecting into furniture. Obviously only those which are free from odor can be used advantageously. I think some of these have sodium silico-fluoride as the principal ingredient with perhaps a small amount of common salt in solution as well. Others are undoubtedly organic compounds of more complex character and which have been developed as secret formulae. What may be called permanent moth-proofing may be secured by certain substances which act like colorless dyes and may be fixed on the fabric by similar methods of treatment. Great advances have been made in this important line of work.

From a practical standpoint it is important to know something of the behavior of these insects toward heat and cold. The use of cold storage for furs has become extremely common in all large cities and if the storage is maintained under suitable conditions, the protection which is afforded is practically complete. The low temperature does not, however, destroy the eggs, and it may not destroy the larvae so that on removal of such material from cold storage to the warmth of spring and summer weather development could conceivably take place. It has been observed, however, that subjecting the organisms to rather sudden and marked changes in temperature tends to destroy or weaken them to such an extent that they are unable to recover. Exposure to temperatures of 30-40° F. for a short time, then raising the temperature to 50° F. or above for two or three days and then exposing them to temperatures in the neighborhood of 20° F. is effective in that all the moths are killed. I believe this process is now used extensively on a commercial scale.

On the other hand, if infested garments are put into cold storage at temperatures below 42° F. the eggs and larvae will not be destroyed although no damage will result during the period of storage. Larvae have been found to survive temperatures of 24° F. for a period of more than six months and 40° F. for practically a year. It should, therefore, be borne in mind that cold storage is an inhibitory process but not a truly destructive one.

It is also interesting to note that moth action can be inhibited by the action of high temperatures, and especially high dry heat if it can be applied. Temperatures of from 125-140° F. will kill the larvae of clothes moths very quickly. Back has shown by experimental work that larvae exposed to 128° were killed in six minutes and those exposed to 110° F. were killed in thirty-one minutes. At 105° F. twenty per cent were dead at the end of thirty-one minutes. It is clear, therefore, that the killing power of heat can be readily utilized by ironing fabrics by hot irons or exposing them in a superheated room for suitable periods of time.

Undoubtedly other new methods of chemical treatment of fabrics will be devised. Manufacturers of disinfectants and other chemicals have developed a large number of very toxic substances for microbic life, especially bacteria, often with highly specific characteristics. That these are not all effective on the larvae of insects goes without saying. A good example of this is formaldehyde which is a strongly bactericidal substance in suitable solutions but seems to be not especially effective or at all effective in the destruction of larvae. Similar products with highly specific toxic action on eggs or larvae are certainly possible. It seems evident that the problem is sufficiently important to warrant a great deal of study. So also is the study of X-rays, ultra violet, and high voltage treatments.

A great many impractical or worthless substances have been recommended to the housewife. Such things as cayenne pepper, lavender flowers, tobacco powder, pyrethrum stems, borax and lead oxide as well as red cedar leaves and cedar chips are absolutely ineffective. Dipping in gasolene, on the other hand, is an effective method of control but can only be applied to small pieces of fabric. For wholesale disinfection, as for example in storage rooms for wool and fur, unquestionably the most effective method of treatment is by fumigation with hydrocyanic acid, but this obviously must be conducted with the greatest of care and under careful supervision because of its danger to human life.

Finally—I wish to emphasize that the moth problem is a real one and I know it is of special interest to men of your profession. I have not mentioned the action of dyes, as my own information on this point is very scanty. There is obviously some selectivity as some colors seem to restrain action of the larvae much more than others. Whether this is due to the nature of the dye, or as in the case of mosquitoes to some apparent color selection on the part of the insect, it is difficult to say.

U.S.D.A. Farmer's Bulletin 1353. Clothes Moths and Their Control. British Museum. Econ. Series. No. 14. Clothes Moths and House Moths.

## DISCUSSION

*Q.* Has the color anything to do with the moth's attack—brown clothes for instance?

*A.* I got the impression that they do like certain colors better than others. They did not eat bright colors very well and they wouldn't attack at all some of the blacks I had. I don't know whether that was due to the dye that had been used on these fabrics or not. Mosquitoes have a distinct color sense, so why not moths? If you go into the woods in a grey suit, you will not be troubled by mosquitoes as you would if you had on a blue serge.

*Q.* Do you know whether commercial mothproof treatments are very effective?

*A.* They are effective for a while. I don't know just what there is in mothproofing treatments.

*Q.* What method is used?

*A.* It was a secret formerly, but I think some silicofluoride is used and it helps for quite a while after the goods have been soaked. After a while the fabric gives up its chemicals to a certain degree. The moths will then begin to work.

*Q.* Do you know anything that will attract moths?

*A.* I don't know what will attract them.

*Q.* About ten years ago Mr. Christison made the statement that it was easy to kill moths, but very hard to keep them alive.

*A.* I wonder if he didn't have the same trouble I did when I started to raise the moths. I too had trouble in keeping them alive, but found that the moths were easier to keep alive if I didn't remove them from the burrows, cases and so forth, but transplanted them with their silken houses. If you move the moths, move the whole case. I think that will work.

*Q.* Do you find that feathers are a better food for moths?

*A.* I do not think anything is best, although feathers are good. We had a small couch pillow around for quite a while and one day I saw a moth come from the pillow and then another one. I ripped open the pillow and found a lot of moths. The feathers were just old enough or ripe enough so that they enjoyed living on them very much indeed. Some of the feathers were eaten and some not touched. I think it must be some selective action on the part of the beasts themselves.

*Q.* Clothes that have been dry cleaned and put away seem to be less open to attack than clothes that have not been dry cleaned.

*A.* There is not full protection in dry cleaning itself, the protection is in putting the clothes away carefully after dry cleaning.

*Q.* We found it better to have them dry cleaned before putting them away.

*A.* Of course. Yet some people seem to think that if you don't put them away at all it is better, just move the clothes from time to time and the moths won't go into them. However, I never have been able to convince my family of this.

*Q.* You made the statement that cedar chests and such were not any protection. Is a cedar closet of any use?

*A.* If you have red cedar heart wood and it is reasonably fresh it is good. The same is true of a new cedar chest that has a real strong cedar oil smell. Cedar closets and chests that are not fresh are not effective.

*Q.* Can you buy any cedar oil to apply?

*A.* Yes, you can get oil to rub cedar wood or to brush over the wood.

*Q.* How often must this be done to be effective?

*A.* Every year.

*Q.* At what time of the year are moths most destructive?

*A.* In the spring. It seems that after the winter the moths naturally search for a mate, although in heated houses the damage is all year round.

*Q.* You mentioned the action of sunlight on moths. Would ultra-violet light be effective?

*A.* Any light would keep the moths away. I asked my associate, Dr. Blake, if anybody had done any work with ultra-violet light or rays on the destruction of moths and he said lots of work has been done on various insects, but ultra-violet is not particularly fatal. You can get all kinds of monstrosities to develop from eggs by starting that way.

*Q.* The mill men are continually being asked if a fabric which is mothproofed and is dry cleaned, will it still be mothproof. What conditions of temperature and humidity are best for testing?

*A.* Ordinary room temperature—65-75° F.—is a good temperature. The humidity makes no difference as the organism is not at all dependent upon atmospheric moisture. The way in which you can keep your sample is in a broad test tube stoppered with cotton, just as a bacterial culture, with not too much fabric, but enough so that, the moth can get to the inside where it is dark, and then keep in a dark room.

*Q.* If a temperature of 120° F. is promptly fatal to both larva and moth, would a steam radiator in a tight closet be a good treatment?

*A.* I think it would work. We have not used high temperatures, but it could probably be used. I wonder if in the storage of wool it not better to have a hot room than to mothproof. Just heat it up enough to kill the larvae and then remove the wool.

*Q.* Wouldn't there be more danger of combustion?

*A.* I don't know.

*Q.* The high temperature would have to be continued only for a short time?

*A.* Yes, at 140° F. they only live three minutes, at 128° F. all would be killed in six minutes (not a very high temperature) and at 110° F. they are killed in thirty-one minutes.

*Q.* If you did it once a week, would they develop once a week?

*A.* Two or three times during the season would be rather effective.

*Q.* It would seem fairly easy to sterilize a whole house during the summer.

*A.* Doesn't seem to be quite as easy as it sounds. Can you heat a house up to 125° F. every summer?

*Q.* I saw the suggestion in the paper. I didn't realize how low a temperature would accomplish it.

*A.* Of course, if you start your furnace on a hot day in summer you might be able to get the temperature. Whether you can get a uniform temperature is the question.

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## MORE ON GETTING ALONG WITH PEOPLE—IV

### Arguments and Issues

ARGUING is one of the joys of life, but it is usually a poor way of accomplishing anything in technical work although a natural outgrowth of opposition to one's ideas.

A sensible discussion in search of facts may involve argumentation but an argument in the ordinary sense, is readily recognized as something else. It is a contest and, whether or not there was any sense in starting it, nobody wants to lose in a contest. Whether the facts are on his side or not, each opponent simply must make out a case.

I have frequently been reminded of two boys I know. They get into a most vigorous argument and in their enthusiasm and effort to win they quite forget what the problem was that started it. Grown men are much like that too.

Argumentation has its place as in the practice of law. You, as a salesman of your services and ideas should have a ready answer perhaps, but remember also, as a great salesman has said, that salesmanship is not argument.

Again speaking generally, violent or impassioned arguments are out of place in technical affairs.

In the everyday arguments that you hear neither of the participants wants to be convinced of anything and frequently enough, neither cares to learn anything. If the chemist who is to work in the plant is of this type he will be far better off to get over it at once. He should become willing to learn but not willing to waste time trying to put over an argument (as distinguished from a real proposition).

The arguments which come up in connection with proposed mill experiments frequently arise from a feeling of opposition to some new idea. If such a discussion seems to be going too far and getting nowhere drop it and come back when the other fellow is in a more favorable mood; present your problem in such a way that it is obviously worth while (if you cannot perhaps it isn't worth while); or if something verging on an argument seems unavoidable concede everything you can in order to keep the discussion limited to the essentials that are necessary to planning and carrying out the work. If the other fellow comes out a little ahead he will feel satisfied and if you get your work properly done you ought to be, for it will be much more to your own personal interest to complete an experiment or a sample run successfully than to win a verbal exchange which will usually leave you just about where you started even though nominally a victor.

These are not merely personal opinions. "Weakness on both sides is.....the trait of all quarrels." You can see it if you stop to think a minute. Arguing, except as a friendly diversion, is usually based on ignorance or lack of understanding and the more the ignorance the more vigorous the debate. There can be no argument about *facts* except as to their relative value. There is no sense in arguing on the basis of opinions. Find out and when you have the facts most of the argument should disappear.

In addition to arguments which arise from contrariness, suspicion or jealousy there may be opposition based on some real objection to a proposed experiment or process change. If this is suspected or the objection is hidden for any reason, try to bring it out in the open at once. It is best to have all the objections as soon as possible so that any needed revision can be made in your project. Argument may then be unnecessary.

Getting a bit general again, arguments are most easily settled by being avoided and, above all, keep out of those of other people.

In many organizations there seems to be endless bickering and clash of personalities. While most of it may seem called for under the circumstances it is usually quite unnecessary and useless. It seems to be very largely a matter of feeling rather than of thinking. In fact it is very hard to see how a great part of such petty conflict can come about as a result of any logical thought process, unless some one concerned has an ax to grind.

The main point is to recognize how senseless most of it is. You can't do much toward curing it or patching things up but there is little sense in wasting your own time and energy in such squabbles if it can be avoided.

It seems better to try to get along with people than to be constantly battling with somebody. It is enough to have to battle with things and with laws of nature without having to battle unnecessarily with people.

Any useless ill feeling between the departments in an organization, between manufacturing and sales, or between mill and laboratory is just one more hindrance to the success of the organization as a whole. If the whole does not prosper you cannot expect to prosper. If it does, your chances are always better with a successful business.

There are sometimes other issues that are broader and more important than the causes of ordinary arguments.

One of the first pieces of advice offered by a much

older, more experienced man to me, just as I was starting work as a mill chemist, was not to create an issue. He did not mean that I must agree with everybody in the mill, but that there was no need of getting into unnecessary disagreements or getting into such a position that I might get discredited. It is usually very bad technic to force the management to decide between you, a new man, and someone else who is already established in the business.

Time has shown this to be most excellent advice.

It is best at first, until you know your way around, to try to avoid any trouble because small things may very easily grow into big enough ones to cause more serious opposition. In most instances when you do not agree with a foreman in whose department you may happen to have business, it is not at all necessary to say so.

I notice that successful executives often ignore many of the smaller issues that arise and before they come up again they have disappeared or ironed themselves out.

Even though you may be in a position to argue with almost anybody on approximately equal terms it is usually best not to do so. Nowadays whenever an argument or an involved discussion seems imminent I offer to try to find additional facts or to perform some experiment that will answer the question at issue. Frequently this clears up the matter and makes a correct decision easy.

Apropos of arguments and issues, of course there are exceptions. If things definitely interfere too much with your own personal progress or results, or with the progress of your organization where you are responsible for it, and the milder methods do not make any impression you will simply have to meet the issue in a direct and forceful manner.

In my early days I once offended a dyer who was quite powerfully entrenched. I heard of it and since the offense was based on definite and unavoidable orders received from higher up, went immediately to force the issue, took the dyer's bawling out, but instead of arguing merely put the matter back up to the management whose business it was to settle that particular kind of an affair.

Many newspapers with their rather well developed knowledge of mass psychology seem to show very clearly our natural tendency to go to extremes and thus to take sides. They are always starting contests or arguments and trying to create issues. Frequently they do not seem to be much concerned to bring out the underlying facts but rather to create a lot of interest in the personalities involved and to bring out mere opinions. Even in scientific and technical meetings a good snappy argument is of much more interest than the fact or opinions that started it. Since this all seems to be a part of human nature it is easily seen why it is difficult to confine discussions to facts and to avoid the interesting but more diffuse arguments that lead nowhere.

Another too-common reaction is to get "mad" and make a fuss about something. While no one can tell you how to become and remain respected, you will not be if you continually fly off the handle and then find you are wrong and have to eat too many words.

There is not much point in getting mad unless for a real reason after you have all the facts, and then only for a definite planned purpose. In the ordinary course of events if you make as much fuss when small things go wrong as for big ones, the effect is to make the big ones small too, and complaints become useless.

So, remember that most arguments are based largely on more or less ancient conclusions; on pride of opinion, with or without reason; and on the emotions. They have little place in establishing scientific or technical facts.

# TECHNICAL NOTES FROM FOREIGN SOURCES

*(Continued from page 4)*

that the fatty alcohol sulfonates, in contrast to the fatty acid condensation products, possess 'fundamentally" no practically valuable protective-colloid action that is, therefore, when used together with soap in hard water, are not able to hinder the deposition of lime soaps, and, consequently, the attachment of such deposits to the textile goods being treated and that, therefore, the use of fatty alcohol sulfonates to prevent such trouble, in boiling and rinsing, is to be avoided.

The author considers, however, from his own laboratory experiments, that the above point of view is not justified, and further argues that the widespread and continuous use of the fatty alcohol sulfonates, not less than that of the fatty acid condensation products, proves his point.

The fact is, that there are several subtypes of fatty alcohol sulfonates upon the market, of quite different composition as to the alcohols involved, among other things. Such products naturally vary in the degree to which these various characters are developed, as in the case of the well-known difference in the common soaps, for example—formation of foam, consistency of solution, tendency to gel, and so on—varying widely within limits, with cocoanut oil soap, Marseilles soap, palmitic and stearic acid soaps, etc. So that it is not surprising that the products obtained by treating the different fatty alcohols with sulfuric acid under widely different conditions also vary in their properties according to the particular alcohol forming the foundation of the compound, as well as according to the manner in which it has been treated. For example, the sulfonates of the relatively low-molecular cocoanut oil alcohols are superior to those of the relatively high-molecular cetyl or stearyl alcohols in detergent and penetrative action, at low or medium bath-temperatures,

while in boiling baths this relation is reversed absolutely. Generalizations in regard to the fatty alcohol sulfonates as a group are therefore not justified. The author finds that, testing a fatty acid condensation product in parallel with several commercial alcohol-sulfonation-products, there are some of these latter on the market which disperse a formed or forming lime soap as well as, and in some cases better than, products of the acid-condensate type. And there are also some fatty alcohol sulfonates in which the dispersive action is less pronounced or altogether lacking (at least, in the technical sense). It is not at all to the point, therefore, to condemn the whole group of products as fundamentally lacking in the property in question, but, rather, the true attitude to take is, to inquire whether a given product is suited for the purpose in hand.

The remainder of this section of the paper (to be continued) deals with the author's tests, carried out with

a—a fatty acid condensation product.

b—a fatty alcohol condensation product whose alcohol is of an unsaturated nature.

c—a fatty alcohol sulfonate whose alcohol is of a saturated character.

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**The Wood Lamp in the Textile (Dyeing) Industry**

*Maurice Deribere—TIBA* 30, 173 (1935).—A paper dealing with the use of the Wood lamp in the study of fibers and dyeings through their fluorescence-phenomena.

The Wood lamp is really the ordinary mercury vapor arc lamp, whose customary form is that of a colorless quartz tube as inclosure, but, in the Wood form, the emission being filtered through a screen of special nickel-oxide glass, which transmits only wave-lengths of from 3650 to 3663 Aongstrom units, and the line 3341 Ao. In this form it was worked out by Prof. R. W. Wood of Johns Hopkins University, and has been given his name. In its best form, its emission is really practically invisible to the eye, and the narrow-range emission, if producing fluorescence in any object or substance examined, therefore makes the substance strikingly visible, and frequently characteristically so. For example, viscose displays a sulfur-yellow fluorescence with violet reflex, acetate rayon a pale bluish-violet, formolized viscose a clear yellow, nitro-rayon a flesh-colored, and cupro-rayon a reddish fluorescence, with violet reflex. Texas cotton fluoresces orange-yellow, Egyption cotton a pale brown, natural silk a clear blue.

A recent form of the Wood lamp has been constructed by the makers of the Mazda lamp, in which the "bulb" consists of a very dark, "black" glass, of higher filtering power. In this form, the only visible emission is a very faint violet, which does not interfere with practical work (in the usual form of the Wood lamp, as we have seen it, there is likely to be a sometimes annoying amount of visible light, though still faint).

The second section of the paper (l. c. p. 607) includes three tables, giving the fluorescence characteristics of a considerable number of different specimens of cotton of recent origin (Table I covers 38 specimens of Indian, Japanese, Chinese, and American cottons, giving the type of fluorescence, % of $NH_3$, urea, and sodium sulfate present, Table II covering twenty specimens of old cotton, giving the figures for the same items, and Table III a much shorter table of the same sort). There is an interesting section upon the distinctions between cotton and other fibers. Between cotton and linen, for example, the distinction in fluorescence is best observed by soaping the goods, then impregnating in a 0.5 per cent solution of o-hydroxy-quinoline sulfate (quinosol of commerce), then washing carefully, then treating with a 5 per cent solution of sodium carbonate. The cotton, mercerized or not, appears a dull violet under the lamp, while the linen gives a canary-yellow fluorescence. Fluorescence phenomena can be accentuated by impregnation with zinc salts, or by soaping, washing, impregnating with sodium carbonate, then with zinc sulfate, and washing. With wool and cotton, impregnation with a solution of Amido G salt and rinsing carefully is of help. The wool then gives a blue fluorescence, while the cotton fluoresces brown or brownish-violet.

With boiled-off cotton, there is a difference perceptible between unboiled, partially boiled, and completely boiled-off fiber, but the differences are not sufficient to serve as a means of determination or estimation. But the Wood lamp does make it possible to detect improperly kiered portions of a run, the distinction between thoroughly cleansed and improperly cleansed spots making it possible to locate and remove the latter.

As to defective mercerization, about the same statements are valid. Impregnation with a number of compounds will make the distinction between properly and improperly mercerized goods very apparent. Such compounds are the following organic salts: F-salt, sodium naphthionate, N.W. salt, SS salt and its sulfamide, R-salt, G-salt, Schaeffer salt.

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**Dyeing of Weighted and Unweighted Silk (Natural)**

*Dr. E. Eloed and N. Balla—Monats. f. Seide u. Kunstseide* 40, 12 (1935).—Level dyeings upon weighted silk, with acid dyestuffs, in baths made acid with sulfuric acid, are easily attained, but such dyeings in a nearly neutral bath (pH about 5.0) are possible, with certainty, only with silks which have been piece-weighted. Silk weighted in the skein can hardly be given a level dyeing unless by accident. Dyeing silk at the usual high temperature, in strongly acid baths, must surely damage the silk substance; but little or no exact information regarding the matter has as yet been available.

The authors have, in this paper, given the results of their study of the relation between dyestuff solutions of different hydrogen-ion concentration, and silk, both weighted and unweighted. They have also kept in mind the acquisition of further experimental points of view regarding the theories of the dyeing process, already presented by the senior author (E. E.) and his co-workers.

It has already been shown (Eloed and others) that the

distribution of the weighting agent in the silk fiber is very non-uniform, while this non-uniformity of distribution of the particles in silk weighted in the piece can be more or less compensated for, while in skein-weighted silk this partial levelling-up of the weighting material cannot be easily brought about. If this non-uniformity of distribution of the weighting-material is to be considered in the cases of non-level dyeing of weighted silk, two questions must be answered:

a—whether the dyestuff is taken up by the weighting-material, and held fast in an insoluble form.

b—whether the weighting material is capable of influencing, perhaps locally, the pH value of the silk, through acid or alkaline reaction, or through the formation of compounds with the silk substance.

It has been established, by X-ray studies, that no combination, in the chemical sense, exists between silk substance and stannic hydroxide (Eloed and Pieper). We have no knowledge, as yet, as to whether the final form of tin-weighting, that is, stannic phosphate-silicate, has any more than a physical relation to the silk substance, though Herzog and Gonell have proved that silk weighted with stannic phosphate-alumino-silicate displays the diagram of both silk and the weighting substance (i.e., each independently existent). There is no evidence, at least, of the formation of a compound.

It was found, during the present study, that technically-weighted silk retains alkaline constituents obstinately. Even after very careful and very exhaustive removal of the soap, contained in the technically weighted silk, before dyeing, the removal of the alkaline reaction of the wash-water was successful only after about 3 weeks of washing in running distilled water. This fact suggested the possibility of a complex sodium-containing compound in the weighting-material, regarding which no information is extant.

The authors accordingly worked with weighted silk which they had purified by electro-dialysis, where weighted silk was involved. The silk, weighted as usual in the four-bath sequence of stannic chloride—sec. sodium phosphate—sodium silicate—soap, was carefully washed with warm distilled water, then electrodialyzed between a platinum anode and a chromium cathode, in running distilled water, at a tension of 110 volts, until the cathode liquid, as it flowed away, reached a pH value of about 6-5.5. The anode liquid was of acid reaction, but neither phosphoric or silicic acid could be detected. No degradation-products of silk-substance could be detected in the wash-water (biuret reaction, Lassaigne nitrogen test). After this dialysis, the silk was washed with conductivity water until a pH value of 4.1-4.2 was reached. Apart from some slight deviations, this value was easily reproducible, and was taken as the iso-electric point of weighted silk. The dyestuff used in the experiments was a specially purified Crystal Ponceau 6R, furnished by the makers. The course of the reactions involved was followed by colorimetric determinations, by following the change in pH concentration, and of the chlorine-ion concentration. The ratios of bath, concentration of dyestuff, weight of silk, H-and Cl-ion-concentrations, were systematically varied from experiment to experiment.

The paper is to be continued.

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### Decomposition of Hydrogen Peroxide in Alkaline Solution, and its Importance for the Bleaching of Cotton

*Dr. Chr. Dorfelt—Monats. f. Textil-Ind.* 50, 67 (1935).—The first section of this paper has already been reviewed.

The present part deals with the exact progress of the decomposition of peroxide in the presence of several substances involved as stabilizers, and contains five graphs, a short analytical table, and two diagrams illustrating the apparatus employed in certain pH measurements.

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### The Evolution of Textile Assistants

*Dr. K. Cremer—Mell. Textil-Ber.* 16, 288 (1935).—A continuation of a previous section of the paper. It is a descriptive discussion of the sulfonation-products of alkylated naphthalenes, of sulfonated amides of the higher fatty acids, and of the sulfonation-products of the higher fatty alcohols.

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### Indigosols in Printing

*Dr. G. Torinus—Mell. Textil-Ber.* 16, 327 (1935).—A descriptive, commendatory discussion of the use of this class of colors for printing. No recipes (or at least nothing but brief, incidental ones) are given, but the whole subject is taken up in a general and also very detailed manner. The paper is well worth reading for those contemplating the use of the Indigosols for printing, and for those who are having trouble with the process. The paper is full of valuable information.

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### Woolen Printing Upon Unchlored Wool (Bisulfite Process)

*Dr. E. Justin-Mueller—Mell. Textil-Ber.* 16, 322 (1935).—A short, but detailed description of the process from the practical standpoint. Two recipes (one a fundamental one) are given.

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### Importance of Certain Organic Preparations in Finishing

*G. B.—TIBA* 30, 159 (1935).—A discussion of some of the means proposed or now in use for imparting certain desirable finishes to goods. The paper has reference to the process of coagulation of colloid mixtures, etc., upon the fiber after its impregnation with them; and takes up the use of urea and allied substances, and of phenol-formaldehyde mixtures, as resinified to a greater or less degree upon the fiber. A paper of general nature.

# TRADE NOTES — NEW PRODUCTS

### • RAPIDASE MOVES

The Wallerstein Company, manufacturers of Rapidase, moved to new offices located at 180 Madison Ave., New York City, on January 1st. This is said to be necessitated by an expansion of their business in the various industries that they serve. Modern equipment for research work will be installed. The executive offices will occupy the nineteenth floor and the two other floors will be reserved for the laboratories and general office personnel.

### • HOUGHTON RELEASE

E. F. Houghton & Co., 240 West Somerset Street, Philadelphia, announces the release of the following product:

*Silklubric No.* 46—said to be an economical silk soaking oil, used as a soaking medium for crepe yarn, grenadine and backwound hosiery. It is a claret colored emulsifiable product composed of animal and vegetable oils, plus a penetrant. It is said to be soluble in hot or cold water, to make a creamy white emulsion and that it may be added directly to the bath without pre-heating or dispersing in water. It is claimed that it facilitates dyeing and finishing because of the absence of mineral oil. It is said to give better running conditions due to its high degree of penetration and lubricity and to give a high clearance. It is stated that it is low in ultimate cost.

### • GENERAL RELEASES

General Dyestuff Corp., 435 Hudson Street, New York City, announces release of circulars on the following new products:

*Brilliant Benzo Violet B A*—a direct dyestuff said to produce very bright shades of a bluish violet on cotton, rayon, pure or weighted silk. Such shades are said to be easily dischargeable to a pure white with Rongalite C W. Circular G-148.

*Alizarine Supra Sky S E*—a new acid color brought out by the I. G. and offered to the trade by General. Dyed from a Glauber's salt-acetic acid bath, it produces bright blue shades said to be of good fastness to light, washing and salt-water. It is especially recommended by the manufacturers to the knitting trade, as bright blues and greens may be produced, which, it is stated, could not be obtained in these fastness properties so far. Effects of rayon or acetate silk are left perfectly clean. It is also said to have good affinity for silk. Circular I. G. 1249.

*Fastusol Blue L F 3 G L*—producing a very bright greenish shade of blue said to possess exceptional fastness to light. The color is also said to have very good affinity. Circular I. G. 1248.

*Fastusol Violet L F F R*—producing exceptionally clear and bright violet shades said to have very good fastness to light. Circular I. G. 1253.

*Anthralan Orange G G*—offered as a level dyeing acid orange said to possess very good fastness to light and especially recommended by the manufacturers for mode shades in combination with colors like Fast Light Yellow G G X Conc., Fast Light Red B A, Supra Light Rubine B L A, Alizarine Direct Blue A R A and A G G. In general fastness properties it is said to answer the requirements for ladies dress goods; effect threads of cotton, rayon and acetate are said to be practically unstained. It is stated that it discharges to a perfect white with Rongalite C W. Circular I. G. 1260.

### • TEXTILE CHEMICAL MOVES

Effective the first of this month, the Textile Chemical Products Co. of Greensboro, N. C., removed its plant to the building on the High Point road, known as the Carolina Body Plant. This provides a floor space all on one floor of 30,000 square feet and will entail extensive alterations and improvements to the property. An expanded laboratory, under the direction of S. V. Valjavec, will be opened. The company is materially enlarging its facilities for sulfonation and manufacture of various specialties. Special equipment will be installed to take care of the manufacture of a highly specialized line of organic finishing compounds to be placed on the market early this year. The sales organization of this company was expanded last fall by the addition of Hal W. Field in the Southern territory, Cato Littleton covering the hosiery trade in North Carolina and Claude Harris who represents the company in the Pennsylvania-New Jersey district and the New England states.

The company was organized in 1931 by Joseph R. Morton and J. D. Pell and continues under the same ownership and under the active management of Joseph R. Morton. Among the products of the company are sizes, oils, finishing compounds, soaps, cleansers, gums, tallows, gelatines, glycerine and chemicals.

### • PERKIN MEDAL

The Perkin Medal for 1937 was presented on January 8th to Thomas Midgley, Jr. of the Ethyl Gasoline Corporation at a joint meeting of the American Section of the Society of Chemical Industry and the American Chemical Society, held at The Chemists' Club, New York City. James G. Vail, chairman, presided over the meeting. The program included a talk by Robert E. Wilson on the accomplishments of the medalist, presentation of the medal by Marston T. Bogert and delivery of the medal address by Thomas Midgley, Jr.

Mr. Midgley discussed the use of the periodic table in the research which led to the development of antiknock gasoline and organic fluoride refrigerants. His paper was entitled "From the Periodic Table to Production."

In accepting the medal as recognition of his work, Mr. Midgley gave credit to C. F. Kettering, T. A. Boyd and Carroll A. Hochwalt for their assistance in the development of tetra ethyl lead and to Albert L. Henne for his aid in the development of the organic fluoride refrigerants.

Mr. Midgley was born in Beaver Falls, Pa. on May 18, 1889. He attended the Betts Academy in Stamford, Conn. and received his M. E. degree from Cornell University in 1911. He is at present Vice President of Ethyl Gasoline Corporation and of Kinetic Chemicals, Inc.

### • REJOINS MELLON INSTITUTE

Dr. Lawrence Wade Bass has been appointed a member of the executive staff of Mellon Institute of Industrial Research, according to an announcement of that institution. Dr. Bass served as executive assistant at Mellon Institute during the period 1929-31 and is returning to that organization as assistant director after being connected with the Borden Company, New York, N. Y., for six years, first as assistant director of research, then, since 1932, as director of research. He will assume his duties at the Institute on January 1, 1937.

Dr. Bass, who previously distinguished himself by his researches in organic chemistry and biochemistry, has been devoting special attention to industrial research management and chemical economics. He has made many important contributions to chemical literature. He and Dr. P. A. Levene of the Rockefeller Institute published in 1931 a comprehensive treatise on "Nucleic Acids" as a monograph of the American Chemical Society. Dr. Bass and Dr. Levene have also written chapters for the "Biochemisches Handlexikon," a standard German reference work. In 1923 Dr. Bass translated and published a German book pertaining to the "Chemistry of Inorganic Complex Compounds." In addition, he is the author of a large number of papers relating to his laboratory researches, to his bibliographic studies, and to research administration and chemical economics. He is a member of the consulting editorial board of Chemical Industries.

### • DUPONT RELEASES

The Dyestuffs Division of the du Pont Company, Wilmington, Del., announces release of the following new products:—

*"Diagen" Red M 2 B (Patented)*—a new development in the field of stabilized azoic colors for printing. It is the bluest of "Diagen" reds and yields prints which are said to be fast to power laundry washing with chlorine and to show good fastness to light. It is stated that its manufacture has been carefully controlled to insure a finely ground grit-free product which will give even prints and with which there will be no fear of scratching the printing rollers. "Diagen" Red M 2 B is also said to possess the advantage of being stable in solution over a considerable period of time. It is further said to be brilliant in shade and economical so that it will probably be used extensively for the printing of cotton cloth to be used for dress-goods, handkerchiefs and draperies.

*"Pontamine" Yellow S 3 G*—a new direct yellow offered especially for the dyeing of paper although it is applicable to textiles as well. It is considerably greener, but equally as bright as, "Pontamine" Yellow S X G and is said to include all of the desirable characteristics of the Stilbene colors. It is claimed that it shows good fastness to water, washing and perspiration and that it exhibits much better fastness to chlorine, both when dyed on paper and on textiles, than the majority of direct colors.

*"Pontachrome" Black P 2 B*—a new addition to the group of du Pont chrome blacks which, it is said, is very fast to alkalies, carbonizing, fulling, stoving, light, perspiration, water and washing. It is similar in properties to the well known "Pontachrome" Black P V but a trace greener in shade and superior in exhausting properties and fastness to severe fulling.

"Diagen", "Pontamine" and "Pontachrome" are registered trade marks of the duPont Company.

### • CHEMISTS' CLUB LIBRARY

Leading chemical firms are contributing to the support of the Library of The Chemists' Club (New York) as a result of a campaign now in progress to raise additional funds to modernize and bring up to date this valuable Library.

The Library has been supported by the members of The Chemists' Club but in view of the heavy expense involved and the value of the Library to the chemical industry as a whole, the industry has recently been asked to share in its support and many of the leading chemical firms have responded generously to this request.

The technical staffs of most of the chemical companies have made use of its facilities and know the thoroughness with which the Library covers the chemical field. Those at a distance appreciate its prompt photostat service. In addition to the 40,000 books and reference works on chemical and technical subjects, which are constantly being augmented by current publications, it has bound volumes of many United States and foreign technical periodicals not found in any other library in this country.

For more than twenty-five years, the Library has been open without cost to the chemical industry and the general public. Contributions from firms in the industry during the last few years have helped defray expenses but unfortunately it has been necessary to curtail the purchase of new volumes and even to discontinue some subscriptions.

Under the proposed plan of support, the Club will continue to house and assist in the support of the Library, but in view of the valuable service which the Library renders to the industry and to bring this service up to date and make it even more efficient, the various chemical companies are being asked to make annual contributions over the next five years. Requests for information concerning the Library or contributions to the Library Fund should be addressed to the Library Committee, 52 E. 41st Street, New York, N. Y.

### • JOINS ROYCE

E. E. Yake, Executive Vice President of the Sulphonate Oil Manufacturers Association for a little over two years, has resigned to accept a position as 9ssistant to the President of Royce Chemical Company, Carlton Hill, N. J. During his affiliation with the Association, Mr. Yake spent practically all of his time and effort in the field and is therefore well acquainted with all the members of this industry, both in the north as well as in the south.

Mr. Yake was formerly a Vice President of the Worthington Pulp and Machinery Corp., joining the Sulphonate Oil Manufacturers Association in the N.R.A. era, when the capital goods industry was at a very low ebb. Prior to this Mr. Yake was works manager of the Gilbert & Barker Manufacturing Co., Springfield, Mass. Following eight years of practical work in his teens he earned his way through Lehigh University and engaged at the same time in many extra curricular activities. His broad and well balanced experience in management qualifies him especially well for his new responsibilities.

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### • EVENING TEXTILE COURSES

Registration for the Spring session of the Evening Textile Courses at Columbia University begins on January 30th. Instructors in the various courses may be consulted during the registration period in Room 301, School of Business, from 7 to 9 P.M.

J. J. Reutlinger, instructor in the silk course has resigned to take a position in Peru, S. A. His course will be taken over by Max Steiner of the Stunzi Sons Silk Co. of 1400 Broadway, New York. Courses in cotton goods converting, rayon goods converting, woolen and worsted manufacture and woven and printed textile design are being offered. The lectures are given one night a week for a period of 15 weeks. Students should register in University Hall, 116th Street and Broadway, New York.

## CLASSIFIED

**The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.**

FOR SALE—One slightly used twelve tube Smith Drum Monel Metal Skein Dyeing Machine. Apply Box No. 935, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Experienced operatives for screen printing on Textiles. Apply:—Canadian Art Products Limited, 99½ King St., W., Toronto, Ont.

WANTED — TEXTILE TECHNOLOGIST: Man between ages of 23 and 33 years who has graduated from some recognized textile school and who also has had at least a high school education, wanted by a medium size manufacturer of dyestuffs. This position will involve working in the dyestuff application laboratory for about six months after which an opportunity for selling will be open. In first letter of application please inform us regarding education, experience, age, references, willingness to travel and also enclose a photograph. Write Box No. 936, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.